Croplife

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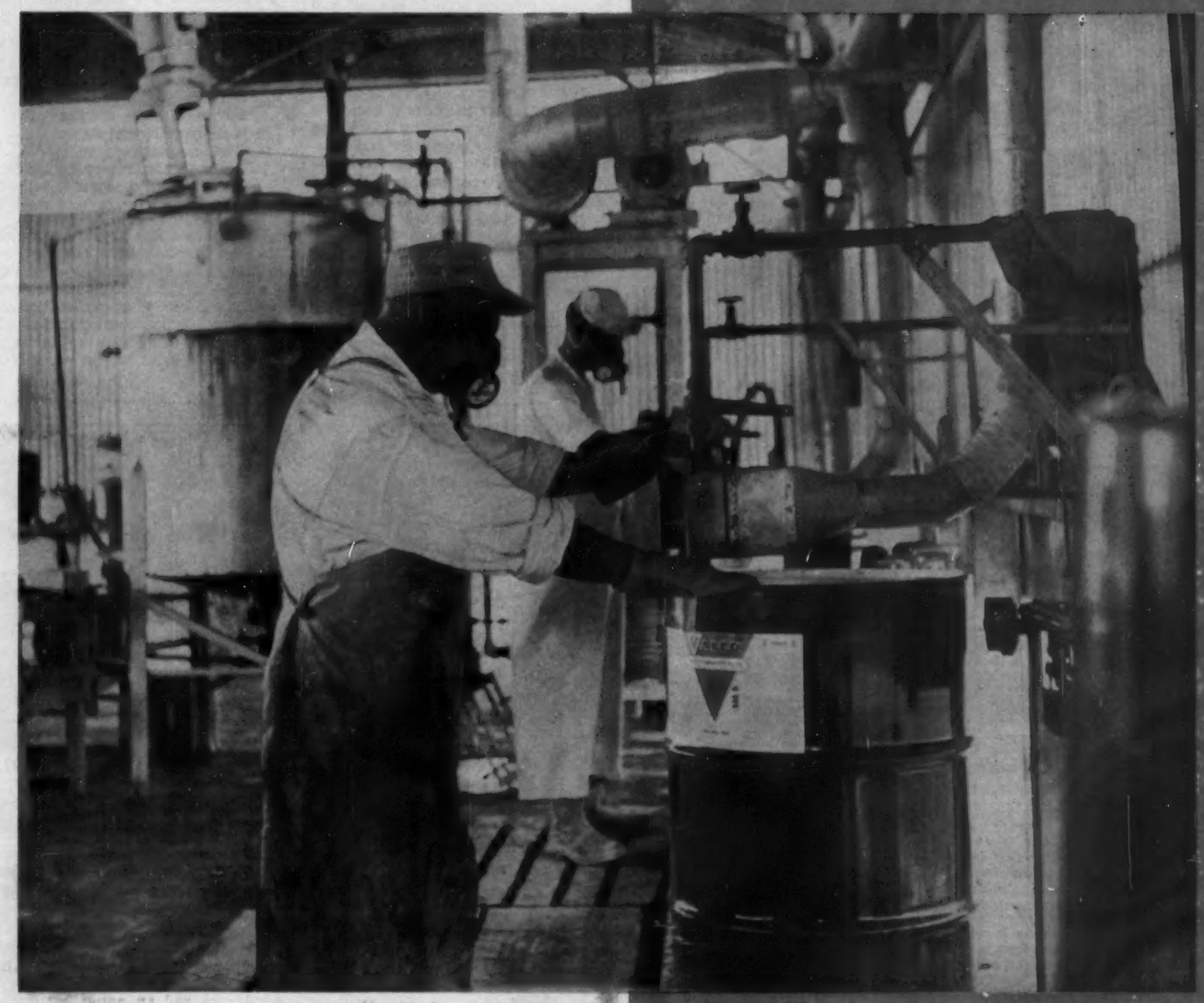
PRODUCTION

EDITION

for Manufacturers of Chemicals for Agriculture



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PESTICIDE MAKER—Strict safety precautions observed in organic phosphate insecticide production have enabled Valley Chemical Co., Greenville, Miss., to maintain excellent accident-free record. See story, page 5 this issue.

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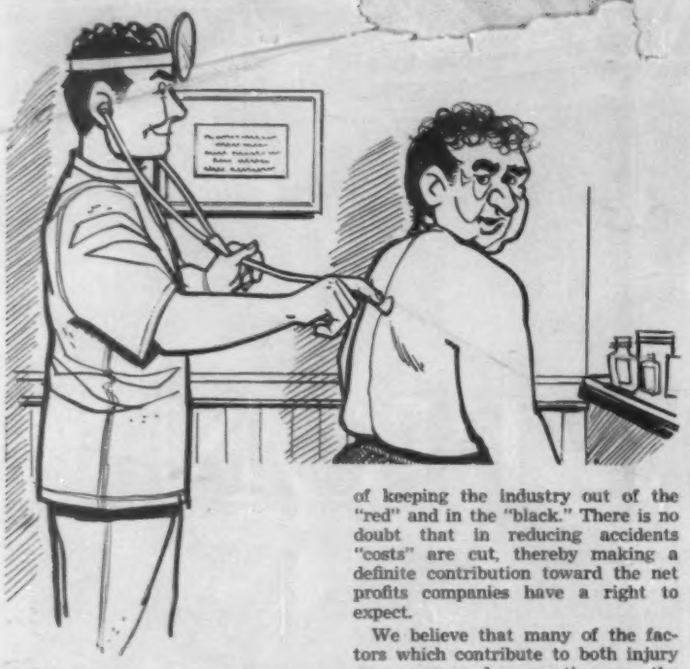
Physical Exams for New Employees Seen As Desirable Move

By George L. Pelton
Smith-Douglass Company
Columbus, Ohio



IS THERE anything that can be done toward making physical examinations of employees of fertilizer and pesticide plants as a means of reducing injuries and, in so doing, reducing industrial compensation premium rates? This in turn would effect an actual savings in costs to the manufacturer.

This question should be of paramount concern to us today because all are struggling with the problem of keeping the industry out of the "red" and in the "black." There is no doubt that in reducing accidents "costs" are cut, thereby making a definite contribution toward the net profits companies have a right to expect.

We believe that many of the factors which contribute to both injury occurrence and prevention, as the case may be, are solely in the hands of management. Let us consider, here, only one of several facts, namely:

> Management selects, hires, and places workers in various jobs within the plant.

Accepting this statement as a premise it can be logically reasoned, then, that if the workers selected are physically and mentally unable to do the work required of them, personal injuries are extremely liable to occur. This brings an attendant rise in operating costs, not counting the individual's economic loss and suffering.

The worker himself has no responsibility at this point because he was hired, not by himself, but by management. Thus, it follows that if injuries are to be prevented, the initial action must stem from the management and every supervisor in the organization must be aware of and accept this fact.

In order not to be misunderstood we are not saying the worker never has responsibilities. However, since we are not dealing with the worker at this time, we will not take up his side of the question except to point out that he does have a definite responsibility to himself and his family to do everything possible to prevent personal injuries both to himself and his fellow employees. The worker's "doing everything within his power," however, must be frequently stimulated, and inspired by management and its representatives.

Now, in order to prevent accidents and cut costs by selecting and hiring workers who are physically and mentally equipped to do the work assigned to them, management has the physical examination to use as a tool in preventing possible injuries.

Many companies have had excellent success by using the physical examination as a means of preventing injuries and cutting costs. It has proved wise, however, for the examining physician to familiarize himself with the company's operations, equipment, location, working hours, personnel and other pertinent factors involved in the situation. It is similarly wise for management to insist that all physical examinations given, should be complete and thorough. This should be true for not only applicants for employment, but also the already-working employees.

The physician should be informed, of course, that the company will not countenance any indiscriminate rejection of applicants or employees.

Results of physical examinations are used in close cooperation with the physician as a guide to selection of employees for labor assignments as well as a screening for rejection.

Our own experience has been that we do reject automatically, upon the physician's advice, any and all applicants for the following reasons, because we believe that any person having any of these conditions is a "potential accident going somewhere to happen";

1. Back deformities or "bad back" histories
2. Active pulmonary tuberculosis
3. Hernias
4. Advanced heart disease
5. Malignant hypertension
6. Tortuous varicose veins
7. Certain respiratory conditions which could become acute by exposure to fumes and dust

We feel by using physical examinations as outlined here that we are conscientiously attempting to face one facet of our management responsibility for the selection, hiring and placement of our employees in positions where they can be made as free from injuries as can possibly be foreseen.

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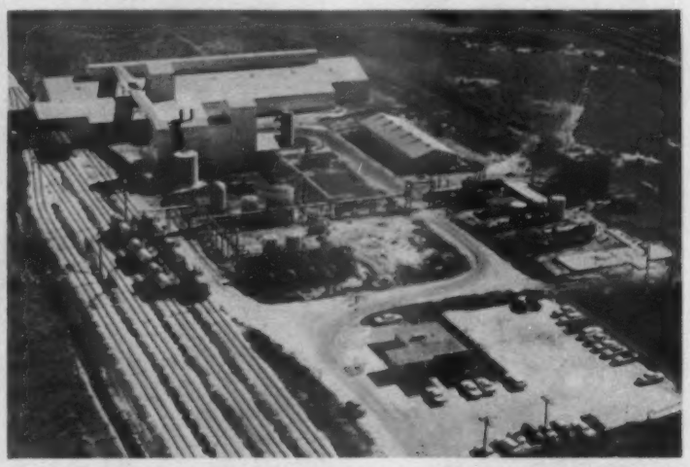

NEW PLANT OPENS—Aerial view of the new $2 million Florida Nitrogen Co. plant at Tampa. The only nitrogen plant in Central and South Florida, this unit produces solid calcium ammonium nitrate and a full line of nitrogen solutions. About 40 employees operate the plant.

New Nitrogen Plant Operating in Florida

TAMPA, FLA.—Florida Nitrogen Co., a wholly-owned subsidiary of Southern Nitrogen Co., Savannah, Ga., held an open house for dignitaries and members of the Florida fertilizer industry recently at its new $2 million plant in Tampa.

The new plant is now in production of calcium ammonium nitrate and a full line of nitrogen solutions for agriculture and industry. In addition, a nitric acid plant is also under construction and will be in operation shortly. The company has about 40 employees and an annual payroll of $225,000. It is the first nitrogen plant in central and south Florida.

George Taylor, president, said the new firm "provides a dependable, year round nitrogen source and brings substantial freight savings to Florida agriculture and industry.

Resident officials at Tampa are R. G. Riley, vice president, and N. F. Maddux, plant manager.

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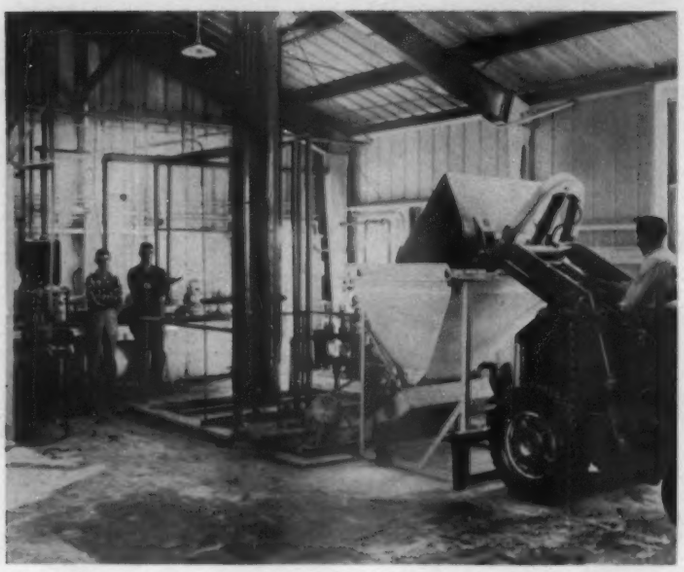
Adding Chelating Agents To Fertilizer Mixtures

By M. B. Irvine and Dr. E. J. Hearn
Dow Chemical Co.
Midland, Mich.



ADDING MANUFACTURED chelating agents to fertilizer is a new concept in plant nutrition to correct secondary or trace metal deficiencies and possibly increase the availability of phosphate. The idea is especially valuable for areas of recognized deficiencies or in high production operations where adequate moisture, weed control and primary plant food fertilization has left trace mineral availability as the limiting factor in crop growth.

Fertilizers including chelating agents can be used by growers without additional work or equipment. In the fertilizer plant, chelating agents can be incorporated into the fertilizer product with existing manufacturing facilities.

These agents can be incorporated into the fertilizer at three points in the manufacturing process:

1. Added in the acidulation of rock phosphate. The stable chelating agents, added at the start of the manufacturing process, remain in the solution all through the manufacturing process and appear in the completed product.

2. Liquid chelating agents can be added in the slurry circuit at the time nitrogen and potash are added. Dry material can be blended into the fertilizer just before bagging of the product.

The above two methods may be used for either liquid or dry fertilizers.

Chelates can be used in three ways:

1. As a chelating agent only, mixed with the fertilizer. In this instance the chelating agent acts on trace minerals in the soil or perhaps those appearing in the fertilizer as impurities. The chelating agent assures that these minerals are available to the crop as plant food.

2. As a chelating agent plus a metal salt. The chelating agent is supplied with a metal salt in cases where a recognized trace metal deficiency exists in the soil. In this case the fertilizer supplies both the needed metal salt and the chelate to assure availability.

3. In the few cases where the manufacturing process may limit the use of the chelating agent plus the salt, a preformed chelate—the chelating agent bonded with the needed salt—should be used. This situation most likely would be found in the production of specialty fertilizers.

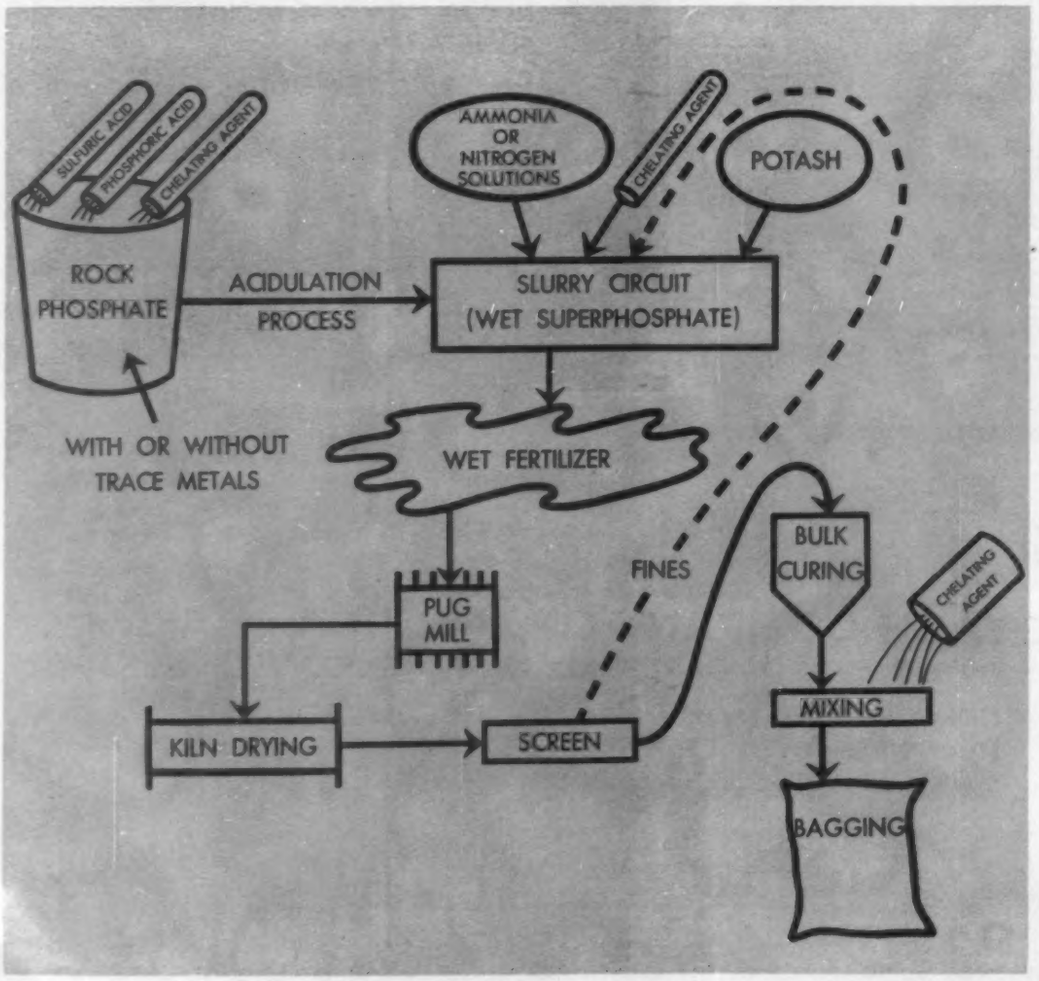
The above three methods are also listed in order of cost. The least expensive is using the chelating agent only. The use of pre-formed chelate is the most expensive and used only in special cases. Chelating agents are less expensive in liquid forms than in dry, and substantial savings can be realized in using liquid forms wherever possible.

Chelating agents have been used in specialty fertilizers for several years—especially in Florida citrus. Current reductions in production costs have made it practical to consider chelating agents for field fertilizers as well.

The need for trace metal supplementation has become more evident with ever-intensifying agriculture. Under natural conditions the organic by-products of decomposition release natural chelates serving the same purpose as manufactured chelates. But under intensive cropping programs and steadily increasing use of commercial fertilizers these natural trace elements have been used in great quantities—far faster than they could be replaced naturally. Many modern farming practices cannot afford the luxury of returning enough organic matter to the soil to meet plant nutrition needs.

Manufactured chelates are said also to have advantage over naturally-occurring chelates in being not subject to bacterial decomposition. Metals combined with the manufactured products also form more stable compounds, less affected by soil alkalinity and competing chemical agents in the soil. The chelating agents are very heat and very chemically stable and can be subjected to temperatures up to 250 degrees C. without breaking down. This means they are able to stand the highly acid production circuits and high temperature drying. Natural chelating agents such as citrates, oxalates and lignin compounds could be broken down readily by these exposures.

Inorganic metal salts have been



ADDING CHELATING agents in fertilizer products may be done in most cases by utilizing existing facilities. Above photo shows first step of adding chelating material to fertilizer in plant. At left is flow diagram showing the three points where chelates may be added: 1. In acidulation of rock phosphate; 2. in the slurry circuit at the time nitrogen and potash are added; and 3. blending dry material into the fertilizer just before bagging the product. Illustrations courtesy The Dow Chemical Co.

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Extensive field tests have shown that chelating agents can be most valuable in correcting secondary or trace metal deficiencies. In a Delaware potato field the use of a fertilizer including a chelating agent yielded an increase of 1,400 lb. of No. 1 potatoes an acre over an area fertilized without the chelating agent.

In Florida a chelating agent was added to muck soils and showed increases of 1.5 tons of pole beans and 1.2 tons of spinach an acre. In Louisiana sugarcane, a chelating agent applied as a post-emergence drench showed increases of 21% in yield and 22.5% in sugar content. Applications to cotton fields have shown increased yields and earlier maturity with greatly increased production in the first picking.

Pesticide Plant Diversifies for Success

By Emmett E. Robinson and Ed White
Croplife Special Correspondents

A STRONG BELIEF in the diversity of products is the keynote to the success of the Valley Chemical Co., Greenville, Miss.

The firm produces chlorinated hydrocarbon and organic phosphate insecticides, pre-emergence herbicides, cotton defoliants and desiccants. All products are sold under the "Valco" brand name.

Valley Chemical Co. was established five years ago by a group of cotton farmers who wanted quality insecticides when they needed them. Production began in 1955 with the purchase of an existing chemical plant from Ashcraft-Wilkinson Co. Since that time sales have climbed to $1,500,000 a year, the owners state.

One of the most striking changes in plant production methods during this time has been the change of emphasis from dust to liquid insecticides. "When we first started production," C. A. Bauer, president, said, "we turned out about 90% dust and 10% liquid. This year, the production picture is almost exactly reversed."

Most of the company's production is concentrated during June, July and August with 20 people employed. The plant is divided into three separate operations: organic phosphates, dusts and chlorinated hydrocarbons. Operators for each unit generally are college students. They learn quickly and are available during the rush seasons.

Queried about the hazards of producing the organic phosphate insecticides, Mr. Bauer replied: "We're very strict about safety regulations. The men are required to wear protective garments at all times. Each man has a blood test and physical examination periodically. Since we began operations here we haven't had an accident of this type reported." The equipment and working area are thoroughly cleaned periodically.

As an added safety factor this unit is constructed several hundred feet from the main plant and is open on two sides. It has a 600-gallon-an-hour capacity.

To help consumers get "Valco" products when they need them, the company has set up seven depots throughout its trade area in the central Mississippi Delta. "When a cotton farmer finds his boll weevil infestation is high he wants his insecticides in a hurry," Mr. Bauer said. "These depots actually mean dollars to a farmer in cutting down on delivery time."

Another "extra" provided by the company to its customers is the services of the technical representative. This man helps with insect scouting, answers questions concerning the use and results of agricultural chemicals and supervises the testing of new products.

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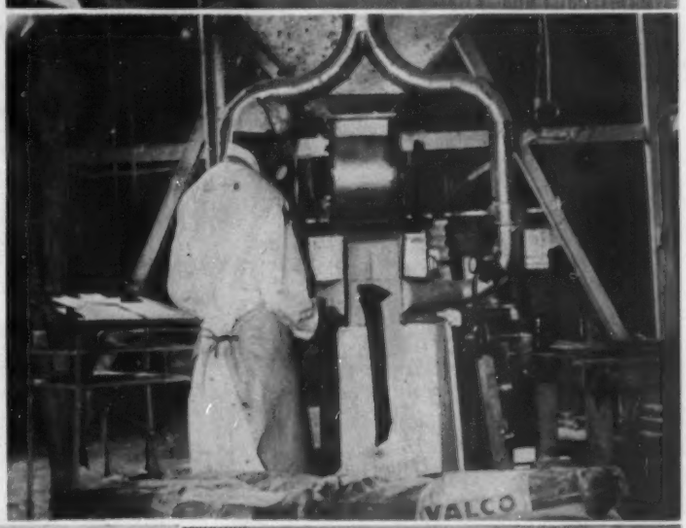

VIEWS OF VALLEY CHEMICAL—Modern plant operated by men with progressive ideas. Above are C. A. Bauer, president, left, and G. R. Scott, checking out customer's order. Company operates on cash basis. At right is workman operating filling device for dry materials. Volume of solids is decreasing as company's liquid products gain in popularity. Lower right: Control board operater handles three production units. Valley Chemical hires college students to augment personnel during peak production periods. Below is outside view of plant at Greenville, Miss.

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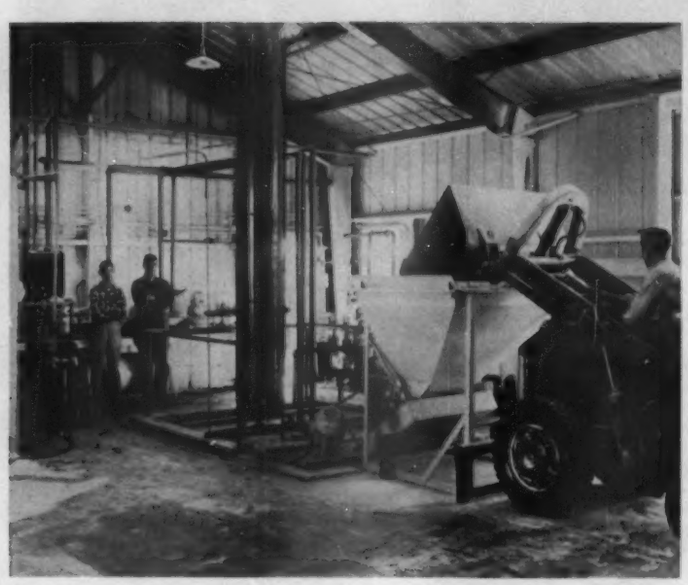

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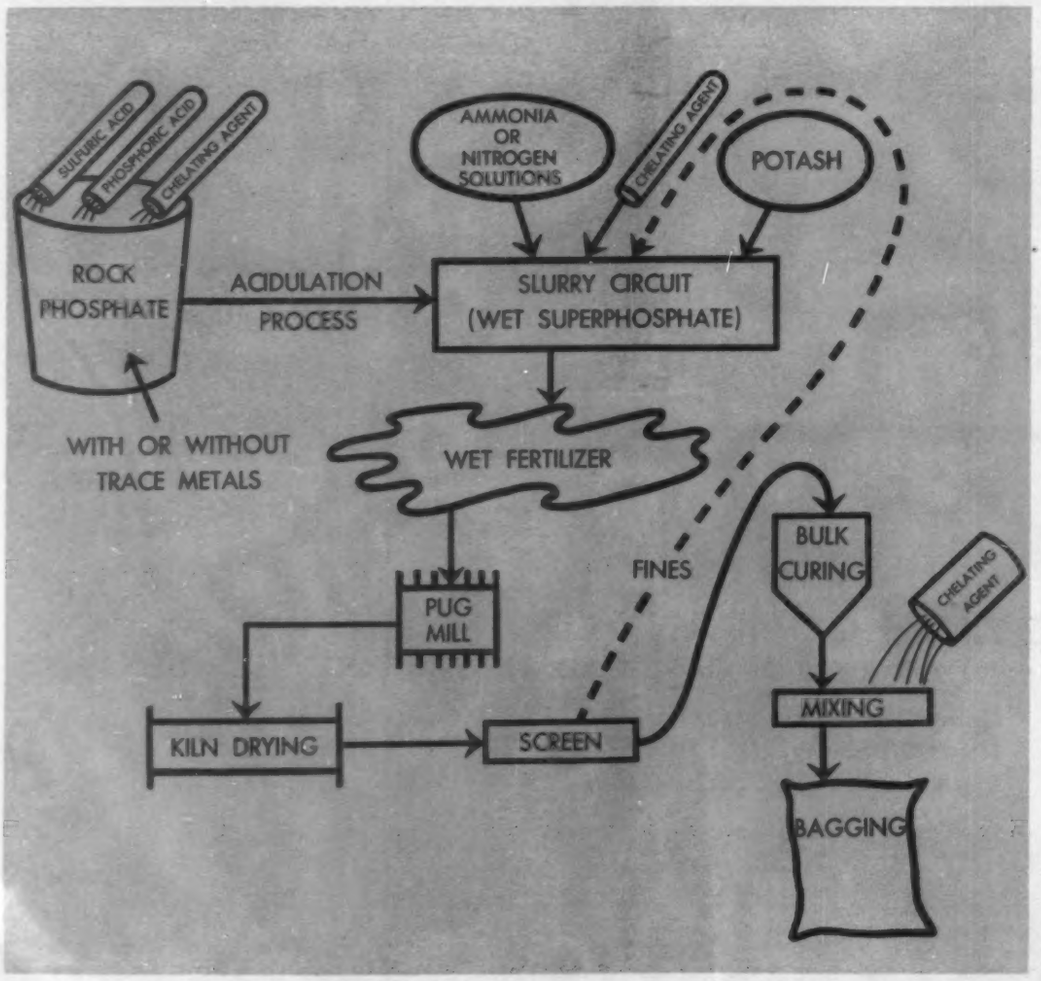

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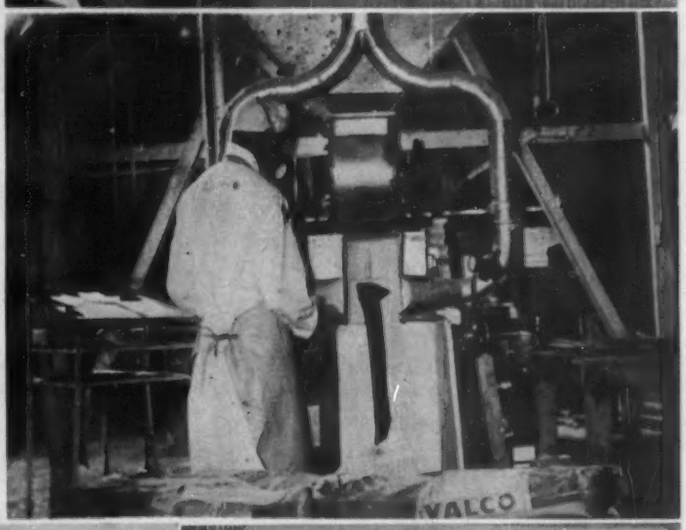

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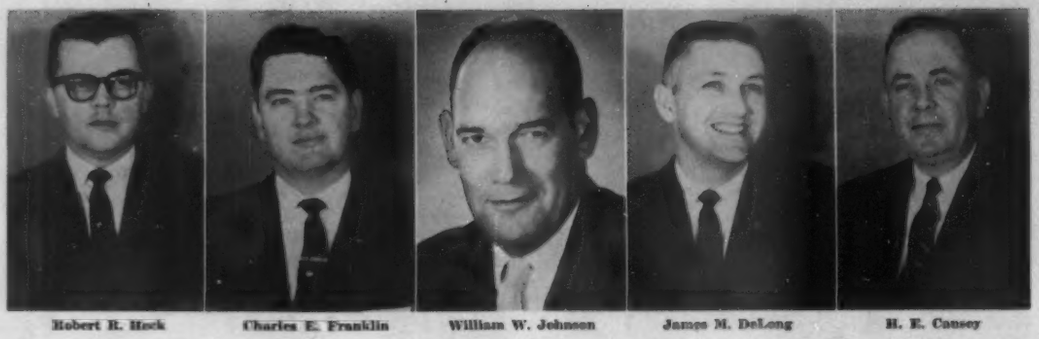
Frank McGrane to New Post on West Coast

LOS ANGELES—Frank McGrane has been appointed manager of the San Francisco office of American Potash & Chemical Corp., according to an announcement by William M. Clines, general sales manager, Western.

Frank McGrane

In his new position, Mr. McGrane will assume responsibility for AP&CC product sales in the San Francisco territory in addition to his present duties as manager of agricultural chemical sales. Richard Reep, sales representative, will continue to serve San Francisco office customers.



Robert R. Heck | Charles E. Franklin | William W. Johnson | James M. DeLong | H. E. Causey

IMC Launches New Technical Service

CHICAGO—International Minerals & Chemical Corp. has completed organization of a new technical service department which the company says will give customer companies unique "full line" service in every phase of fertilizer manufacturing.

Five technical service representatives have been added. Each will work with customers on the full range of nitrogen-phosphate-potash problems, from plant blueprints through to actual production.

IMC officials describe the department as a further concrete example of the "Full Orbit" customer service philosophy of the company's agricultural chemicals division. It follows up sales training and marketing clinics, a transportation counseling service, and counseling in other areas such as credit and insurance.

"The quality of the personnel, the scope of the program, and the resources behind the five-man team help IMC technical service aid customers in keeping their plants operating for peak profits," said Leonard W. Gopp, division vice president.

Mr. Gopp noted that a recent comprehensive survey of fertilizer manufacturers revealed the customers' need for "full line" technical service. The new appointees will operate from the five regional offices of the agricultural chemicals division.

Robert R. Heck, former director of technical service for Southern Nitrogen Co. and before that a research chemist and technical sales representative for Allied Chemical Corp., is assigned to the Shreveport region.

Charles E. Franklin, formerly manager of technical service for the fertilizer division of Phillips Petroleum Co., is assigned to Indianapolis.

William W. Johnson, former technical service representative for Mississippi River Chemical Co. and more recently with Armour Chemical Co., is located in New York.

James M. DeLong, assigned to the Minneapolis region, has been with IMC since 1952, first in research, then as a chemical development engineer at Carlsbad, N.M.

H. E. Causey, who will be in the Atlanta region, rejoined IMC in 1957 as technical service representative in the former potash division. He had been with the company from 1939 to 1948, and most recently had been manager of the Tuscola plant of Illinois Farm Supply.

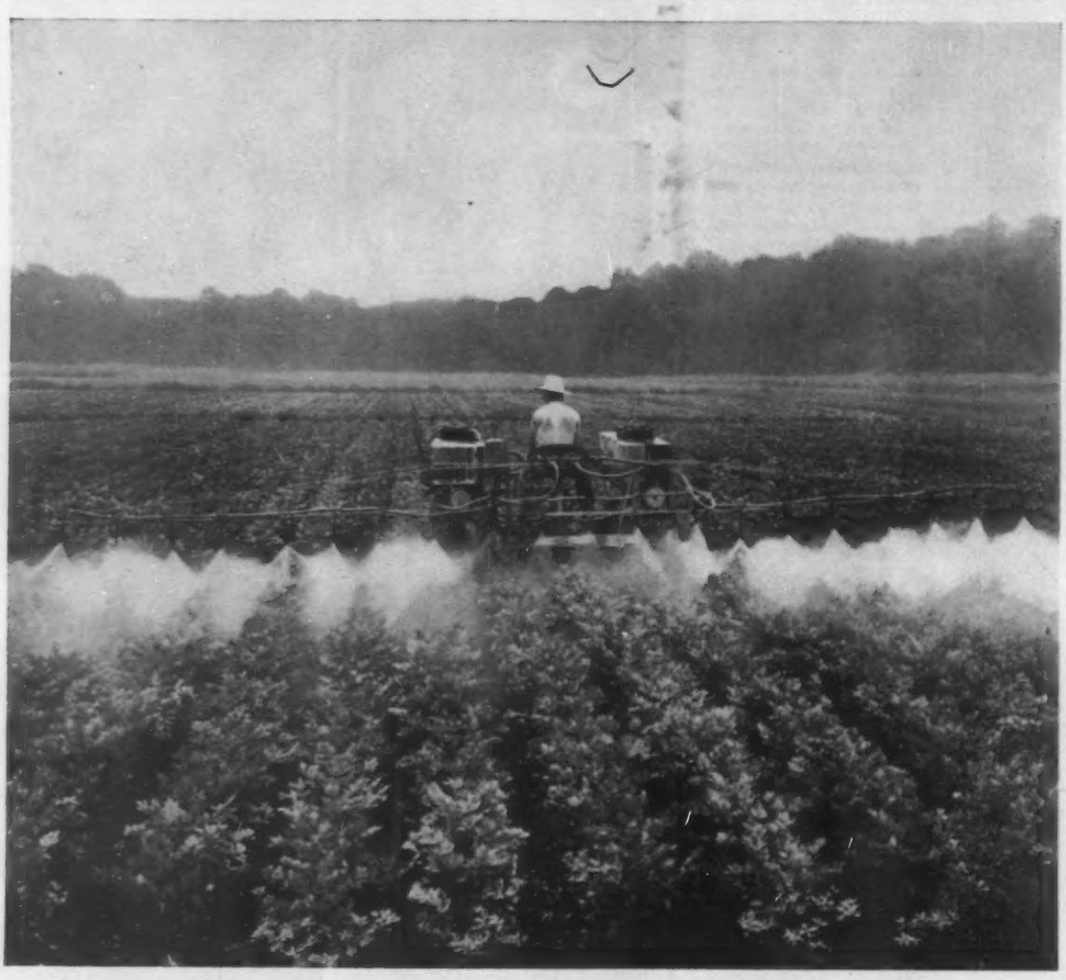
Richard E. Powell, manager of the technical service department, says the new plan of action covers both emergency help as well as current and future needs. The latter will entail a calendar of regular check-up calls on each customer plant. IMC has prepared a 75-point checklist in six major categories as a guide to manufacturers in setting up a preventive maintenance program.

The department also will attempt to anticipate a customer's future requirements in such areas as installation of equipment or a major change in processing. Emphasis will be placed on keeping abreast of current trends and new processes in the industry, Mr. Powell said.

Rebuilt Kentucky Plant Begins Manufacturing

MAYSVILLE, KY.—Ohio Valley Fertilizer Co., east of Maysville, recently began operation of its $300,000 plant which replaces the former facility destroyed by fire in May, 1959. The new unit is double the size of the former one, according to Gilbert Nooe, general manager and treasurer.

The plant will serve a 150-mile tri-state area extending as far east as Charleston, W.Va.



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Cut costs and improve your pesticide with Penola HAN! This heavy aromatic naphtha offers ideal solvency for high quality products. Compatible with active ingredients, its excellent stability assures uniformity. Penola HAN will also promote consumer acceptance of your product through its exceptionally mild odor and light color.

Used as a solvent for herbicides, manufacturers can expect the same fine results from Penola HAN. Used properly in either herbicides or pesticides, it will not harm crops or animals. For complete specifications and information, call your nearest Penola office or write the Penola Oil Company, 15 West 51st Street, New York 19, New York.

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Penola Oil Company

NEW YORK • DETROIT • CHICAGO

last year more than 150 multiwall users reduced their packaging costs thru UNION-CAMP'S

BAG CONSTRUCTION

another FREE service of the 5 Star Packaging Efficiency Plan!

How much could you save through UNION-CAMP'S 5-Star Packaging Efficiency Plan? Look at the record. Last year a single feature of this unusual service—bag construction—helped over 150 companies cut their multiwall costs. By tens of thousands of dollars!

Improved bag construction lowered the basis weight of a southern packer's multiwalls by 10 per cent. He netted $30,000 as a result. Another firm saved $42,000. A third, following UNION-CAMP'S recommendations for a new, stronger closure, largely eliminated breakage and netted packaging economies totaling $4.05 per M.

In addition to bag construction this comprehensive packaging program offers you four other important services. Bag design. Specifications control. Packaging machinery analysis. A survey of your plant. And it's free —regardless of the brand of multiwalls you now use.

Why not take advantage of it now by getting in touch with your local UNION-CAMP man?

UNION-CAMP®
MULTIWALL BAGS
Union Bag-Camp Paper Corporation · 233 Broadway N.Y. 7, N.Y.

★ BAG DESIGN · BAG CONSTRUCTION · SPECIFICATIONS CONTROL · PACKAGING MACHINERY · PLANT SURVEY

Plant Food Institute Names Paul T. Truitt as President

CHICAGO — Paul T. Truitt has been elected president of the National Plant Food Institute by the NPFI board of directors in session at the Edgewater Beach Hotel here Feb. 10. He succeeds J. D. Stewart, Jr., president of Federal Chemical Co., Louisville, Ky., who was elected to the newly-created position of vice chairman of the board of directors. Status of the other officers of the institute was not changed.

The board abolished the positions of executive vice president which had been held by Mr. Truitt and by Dr. Russell Coleman who has resigned to become president of the newly-formed Sulphur Institute.

Mr. Truitt has been executive vice president of the NPFI for the past nearly five years. He previously served four years as president of the American Plant Food Council, which was consolidated with the National Fertilizer Assn. in 1955.

The new president is a native of Millersburg, Mo., and a graduate of the University of Missouri with a BS degree in business and public administration. He has held numerous responsible positions in both government and private business and, in his association with the Plant Food Institute, has instituted numerous services to members and to the fertilizer industry at large.

NEW SULPHUR INSTITUTE

WASHINGTON — Formation of a new Sulphur Institute comprising five American producers and three foreign companies, has been announced. Dr. Russell Coleman, formerly executive vice president of the National Plant Food Institute, was named president.

Headquarters in the U.S. will be in the RCA Building, Washington, D.C. and a European office will be maintained in London, England.

U.S. companies forming the Institute are: Texas Gulf Sulphur Co.; Freeport Sulphur Co.; Pan American Sulphur Co.; Jefferson Lake Sulphur Co.; and Duval Sulphur & Potash Co. The three foreign firms are: Rio Tinto Co., Ltd., London; Bolidens Gruvaktiedolag, Stockholm, Sweden; and Societe National des petroles Acquitaine du Lacq, Paris.

USDA Says Heptachlor OK for Corn and Cotton

WASHINGTON—In a notice issued Feb. 9, 1960, the USDA cleared heptachlor insecticide for continued use on corn, cotton, fruit, berries and other important crops.

The newly-approved uses result in no residues at harvest time in compliance with the recently-established zero tolerances for heptachlor and heptachlor epoxide.

The USDA action opens the way for continued use of heptachlor in the fast-growing soil insect market on corn, and on cotton until bolls open. Other acceptable uses include soil application on small grain, lima beans, tomatoes, and peppers. Also cleared were various berry crops, citrus, cherries, peaches, pears, and pineapple.

In addition, heptachlor can be used on tobacco, for seed treatment and for protection of turf, recreational areas, roadsides, nursery stocks and ornamentals. The latter uses afford protection against such common pests as fire ants, mosquitoes, grasshoppers, European chafers, grubs, and Japanese and white fringed beetles. Heptachlor can also be used for control of termites.

Applications for control of grasshoppers or other insects in pastures and rangeland are approved with the restriction that dairy animals cannot be grazed on treated land and animals being finished for slaughter cannot be grazed for 90 days following application.

To cover the use of current dealer stocks on the newly-approved applications, USDA has established the following procedure:

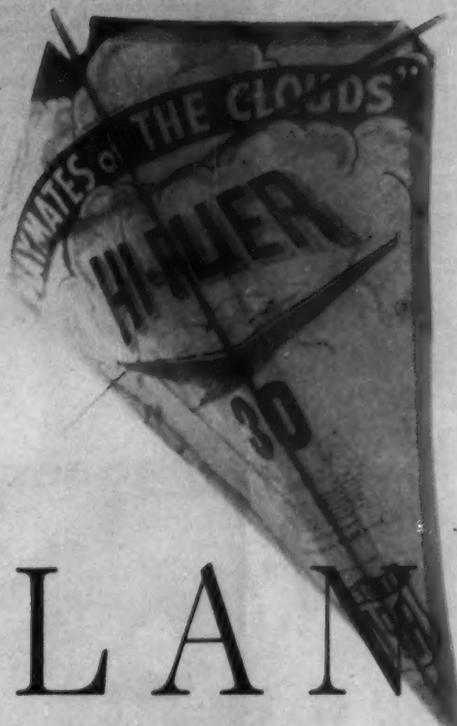
"Under the provision of the Act, directions for use must accompany the product but are not required to be printed on the container label. For example, the directions herewith shown to be acceptable, could be printed in a leaflet or circular and the direction panel of currently-labeled stock covered with a sticker referring the user to the leaflet or circular bearing the acceptable directions."

Important uses not yet cleared include forage crops, cotton boll weevil control after bolls open, and potatoes and other root crops. These uses were previously registered based on a 0.1 ppm. residue tolerance for heptachlor. Velsicol Chemical Corp., makers of heptachlor, report that they will continue to take all steps necessary to broaden still further the approved uses of heptachlor.

TRIANGLE BRAND COPPER SULFATE
a dependable product in your agriculture picture
• for tough-to-mix solutions
• in solutions requiring 25.2% metallic copper
• in solutions that need 53% metallic copper
Triangle Brand Copper Sulfate is compatible with most insecticides. It blends evenly in fertilizers as a soil enricher, and in feeds as a dietary supplement.
WATER TREATMENT
Triangle Brand Copper Sulfate controls pond scum and algae in farm waters.
WOOD PRESERVATIVE
It prevents decay and termite damage to fence posts.
For information on formulating with Triangle Brand Copper Sulfate, write
PHELPS DODGE REFINING CORP.
300 PARK AVENUE, NEW YORK 22, NEW YORK

Carl J. Bauserman

HEADS AAI — Carl J. Bauserman, operator of Southern Michigan Nitrogen Co., Richland, Mich., was elected president of the Agricultural Ammonia Institute when that group met at Dallas, Texas, in January. (Meeting report in Croplife, Jan. 25, 1960, page 5.)



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it's always important to bag-buyers

No *one* thing makes a kite fly. And, in the bag business,
success requires that many essentials be present in perfect balance.
With Chase bags, this includes minute quality control in production . . .
knowing how and where to select the right paper or other
material for absolute protection without waste . . .
and giving the kind of individualized customer service that keeps
the name Chase sky-high among bag users.

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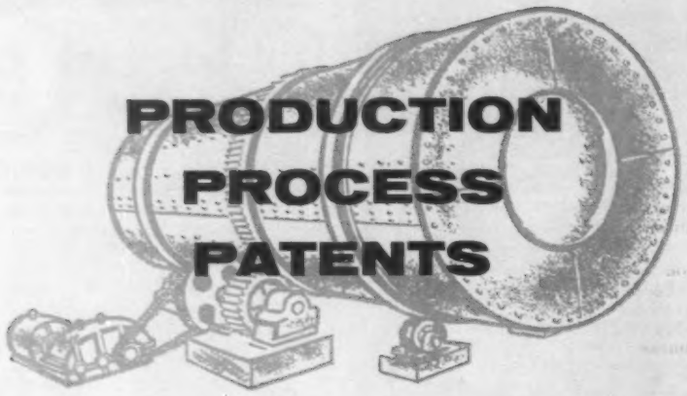
BAG PLANTS AND SALES OFFICES COAST TO COAST – A NATIONWIDE STAFF OF BAG SPECIALISTS



2,923,610

Ammonium Nitrate Compositions. Patent issued Feb. 2, 1960, to Aubrey Edward Harper, Glasgow, Kenneth Harrison, Saltcoats, and Edward Graham Cooke, West Kilbride, Scotland, assignors to Imperial Chemical Industries, Ltd., London, England. A composition capable of self-sustained non-detonating gas-producing reaction consisting essentially of ammonium nitrate and from 5 to 50% of an organic chromium combustion catalyst selected from the group consisting of ammonium tricatechol chromate, pyridine tricatechol chromate, chromium acetylacetonate, pyridine dichromate and quinoline dichromate, and which is solid and chemically stable below 100° C. and contains not less than 5% and not more than 20% by weight of chromium.

2,921,837

Production of Diammonium Phosphate from Coke Oven Gas. Patent issued Jan. 19, 1960, to Edward J. Helm, Pittsburgh, Pa., assignor to Koppers Co., Inc. A process for recovering the ammonia from coke oven gas as crystals of diammonium phosphate which comprises contacting said coke oven gas in sequence with first and second solutions, said first solution being saturated as to its content of diammonium phosphate and containing free phosphoric acid at a pH value of from 6.0 to 7.0 so as to be conducive to the formation of diammonium phosphate by absorption of ammonia from said gas whereby the solution becomes supersaturated with diammonium phosphate, withdrawing said supersaturated first solution from contact with said gas and contacting said supersaturated first solution with previously formed crystals of diammonium phosphate whereby the supersaturation of said first solution is released by the deposition of the excess diammonium phosphate on the crystals so as to leave the solution substantially saturated, and returning said saturated solution into contact with said coke oven gas as said first solution, said second solution being unsaturated as to its content of ammonium phosphate and containing free phosphoric acid of a strength greater than said first solution and of a pH value of 3.5 to 4.5 so as to be conducive to the substantially complete absorption of ammonia from the gas, adding water to said second solution to maintain the unsaturated condition as ammonia is absorbed from the gas, and flowing said second solution to said first solution to replace water evaporated from said first solution by the contact of said solution with said gas.

2,921,847

Iron Chelates of Ethylene Bis-(Alpha - Imino - Ortho - Hydroxyphenylacetic Acid) and Method of Overcoming Iron Deficiencies in Growing Plants Therewith. Patent issued Jan. 19, 1960, to Martin Knell and Harry Kroll, Warwick, R.I., assignors to Geigy Chemical Corp., Ardsley, N.Y.

2,918,500

Treatment of Benzene Hexachloride. Patent issued Dec. 22, 1959, to Hoyt J. Cragg, Baton Rouge, La., assignor to Ethyl Corporation, New York. A process for preparing compositions containing benzene hexachloride which comprises establishing a zone containing a pair of oppositely moving streams of immiscible benzene hexachloride solvents; one of said streams comprising a solvent selected from the group consisting of alcohols, glycols, dioxanes and nitrated alkyl compounds and the second stream comprising a solvent selected from the group consisting of hydrocarbons, chlorinated hydrocarbons and B,B'-dichloroethyl ether, introducing an isomeric mixture of benzene hexachloride including the gamma and delta isomers into the zone to cause benzene hexachloride to dissolve in and become partitioned between the two solvents, the gamma isomer selectively distributing in the said second solvent.

2,918,413

Method and Composition for Producing Gibberellins. Patent issued Dec. 22, 1959, to Carl T. Redemann, Huntington Beach, Cal., assignor to The Dow Chemical Co., Midland, Mich. An improved method for the production of gibberellins by the cultivation of a gibberellin-producing fungus in an aqueous nutrient medium which compises adding to the medium from 50 to 300 milligrams of a member selected from the group consisting of senecioic acid and the alkali metal salts of said acid per liter of nutrient medium.

2,921,097

Production of Insecticidally Active Compound. Patent issued Jan. 12, 1960, to Hans Feichtinger, Dinslaken, Lower Rhine, and Hans-Werner Linden, Moers, Germany, assignors to Ruhr-chemie Aktiengesellschaft, Oberhausen-Holten, Germany. In the process for the production of insecticidally active, normally liquid trichloroethyl - pentachlorocyclopentadiene, having a refractive index,

ARMOUR'S PROGRAM OF PROGRESS

...to serve you better

● Armour's modern ammonia plant near Crystal City, Missouri

For over sixty years, Armour has been serving American Agriculture; supplying the ever-growing demand for Armour and Vertagreen brand complete fertilizers by farmers and home gardeners. For more than a decade, we have served the fertilizer industry with phosphate products from our modern phosphate facilities in Bartow, Florida.

Each year, it has been our aim to improve our facilities, products and services. In 1959, Armour took another step forward to serve you better with the acquisition of a modern ammonia plant at Crystal City, Missouri. Now, Armour's service to agriculture and the industry is more complete than ever.

As America's needs for more and better fertilizers continue to grow, Armour Agricultural Chemical Company will continue to improve the products and services that have made the Armour "A" a symbol of quality in the fertilizer industry . . . the "BIG A" in agriculture.

31 sales offices serving the fertilizer industry

ARMOUR AGRICULTURAL CHEMICAL COMPANY
General Offices, Atlanta, Georgia

n_D^{25}, of 1.5756-1.5765, which comprises contacting reactant hexachlorocyclopentadiene and reactant dichloroethylene in the presence of aluminum chloride and continuing said contacting for a time sufficient to produce the said insecticidally active material, whereby there is also produced during said time an insecticidally inactive normally crystalline material of melting point 71° C. the improvement which comprises maintaining said reactants while being contacted in the presence of aluminum chloride at a temperature below 50° C. to produce a reaction product containing trichloroethyl - pentachlorocyclopentadiene consisting principally of the insecticidally active liquid material in yields of said liquid material in excess of about 30% based on the hexachlorocyclopentadiene converted.

A method of preparation of trichloroethyl - pentachlorocyclopentadiene containing between 65 and 90% of the liquid insecticidally-active isomer, suitable to be directly formulated as a pesticide which comprises reacting hexachlorocyclopentadiene, aluminum chloride and dichloroethylene at a temperature between 20° and 40° C. for a period of time between twelve and forty hours, and recovering the product by vacuum distillation.

2,920,939

Method of Producing Phosphates. Patent issued Jan. 12, 1960, to James W. Edwards, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. In the method of producing alkali metal tripolyphosphates by condensation of a mixture of phosphates other than tripolyphosphates at a temperature below the melting point of said tripolyphosphate, said phosphate mixture having an over-all molecular ratio of alkali metal oxide to phosphorus pentoxide between about 1.5 and about 1.8 and an overall molecular ratio of alkali metal oxide to water of constitution less than about 10, the improvement which comprises adding at least 1 percent by weight of crystalline alkali metal tripolyphosphate to said mixture of phosphates, thereby accelerating the rate of conversion of said mixture of phosphates to said alkali metal tripolyphosphate.

2,914,560

Nitrogenous Compounds. Patent issued Nov. 24, 1959, to Dale N. Robertson, Midland, Mich., assignor to The Dow Chemical Co., Midland, Mich. An N-arylidene-normal-alkylamine having the structure

$$X-CH=N-(CH_2)_n-CH_3$$

wherein X represents an alkyl substituted phenyl radical having the empirical formula, $C_nH_{2n}-$, and wherein n is an integer of from 2 to 3, inclusive.

2,914,574

Dehydrochlorination of Benzene Hexachloride. Patent issued Nov. 24, 1959, to Eli Zinn, Painesville, and James J. Lukes, Euclid, Ohio, assignors to Diamond Alkali Co., Cleveland, Ohio. The method of dehydrochlorinating benzene hexachloride in a fluidized catalyst bed reaction zone in a vapor phase reaction which comprises introducing benzene hexachloride in liquid phase into a fluidized catalyst bed reaction zone maintained in a fluid state by uprising combustion gases, formed by burning combustible gases in a combustion zone adjacent to said reaction zone and introducing the combustion gases therefrom directly into said reaction zone, said reaction zone being maintained at a temperature within the range from 300° to 550° C., and allowing sufficient residence time for said benzene hexachloride as a vapor phase in said reaction zone to effect the desired dehydrochlorination, and removing the dehydrochlorinated products from said zone.

To Retire in March

ST. LOUIS—H. P. "Buck" Walmsley, manager of pricing for Monsanto Chemical Co.'s inorganic chemicals division, will retire March 1, James E. Crawford, division director of marketing, has announced.

Portugal to Allow U.S. Fertilizer Imports

The government of Portugal has announced the removal of discrimination against imports of some 900 customs tariff items from the dollar area, as of Jan. 10, 1960. Although all imports into Portugal require prior authorization, imports of these commodities will now be licensed automatically.

As a result of this move, Portuguese consumers will be able to buy from the U.S. a number of products which have been curtailed for many years. These include fertilizers as well as a number of items including electrical appliances and automobiles.

The U.S. State Department observed that this action represents "a significant step by the government of Portugal toward the elimination of discriminatory and other quantitative import restrictions." With the exception of some agricultural commodities and a few industrial products, Portugal will now extend imports from the dollar area the same degree of automatic licensing as granted imports from members of the Organization for European Economic Cooperation. The U.S. government hopes that Portugal will make rapid progress in removing remaining restrictions, which include some important agricultural products.

Spencer Sales Report

KANSAS CITY, MO.—Sales and net income of Spencer Chemical Co. for the six months ended Dec. 31 were greater than for the same period in the previous year and reflected improved performance in all product divisions. In the six-month period, net sales were $24,520,942, up from $23,878,577 a year before.

"They seem lots lighter when you drag 'em"

Proper Formulation Assures Positive Action . . .
A pesticide formulation built on Diluex or Diluex A will give the best assurance of adequate field performance. Foliage penetration, uniform coverage, improved adhesion, and minimum toxicant fractionation can be obtained in dusts properly conditioned with these quality products.
. . . and on the underside of the plant leaves, too!
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GRANULAR PESTICIDE FORMULATIONS

Adsorptive FLOREX granules offer a superior base for granular soil pesticides, mosquito control formulations and insecticide-fertilizer additives. Available in standard meshes 20/40 and 30/60. Special meshes tailored for experimental formulas.

Have you received the new Floridin bulletin on agricultural chemical processing? It's free; write today.

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"This Sul-Po-Mag program will move fertilizer"..

This is the conclusion of John C. Crissey, Division Manager of the Soil Building Service, GLF Exchange, Ithaca, N. Y., and Mr. George Serviss, Agronomist, as they discussed the SPM program with IMC District Sales Representative, Robert A. Heuerman.

GLF, like many other fertilizer manufacturers, has been using Sul-Po-Mag as the magnesium source for their Super Plant Food. Customers in their area are becoming more and more familiar with magnesium deficiencies . . . the cause of these deficiencies . . . the cure for these deficiencies. To a large extent this awareness of the importance of magnesium has been a result of the fertilizer industry's extensive educational program. Directed to growers and agricultural idea leaders . . . such as vo-ag teachers, county agents and extension specialists . . . this program has helped build a market for manufacturers who use Sul-Po-Mag as the magnesium source for their mixed fertilizers.

To help manufacturers capitalize on this promotion in national agricultural magazines, IMC has prepared a program of SPM selling aids. Newspaper ad mats, tags, seal imprints, posters and direct mail pieces are designed to help each fertilizer manufacturer identify his brand as containing Sul-Po-Mag.

Below your IMC representative discusses promotional materials included in the Sul-Po-Mag program with officials of the GLF Exchange. To learn how you benefit from SPM advertising to growers in your area . . . how you can give your sales an extra boost . . . contact your own local IMC representative and let him give you the full story.

IMC: "We consider this magnesium booklet a very important part of our Sul-Po-Mag promotion. It gives the details on how to spot magnesium deficiencies in many crops and has been very successful in educating growers in all parts of the country."

GLF: "In our selling areas we find that the demand for magnesium-enriched fertilizers is growing every year. Evidently this promotion by IMC is taking hold. We have used Sul-Po-Mag in our Super Plant Food for some time."

IMC: "This Sulphate Bulletin is another helpful way in which IMC educates your market to the need for Sul-Po-Mag. It goes to idea leaders in all agricultural areas and gives information on specific crops. It's published every 3 months."

IMC: "This full color wall chart imprinted with your company name makes customers think of you as specialists in handling magnesium deficiencies. Also, this imprinting helps tie in SPM promotional materials with your total advertising effort."

GLF: "Our bags carry the SPM seal. This is important because we tie our promotion into Sul-Po-Mag . . . we use the SPM mailers, envelope stuffers as well as ad mats for newspapers to tell our customers about GLF Super Plant Food."

IMC: "With the national promotion which IMC directs to specific crop areas — such as cotton, tobacco, vegetables and grains — and the promotion fertilizer manufacturers give at their own local level, Sul-Po-Mag advertising covers all markets."

Products for Growth®

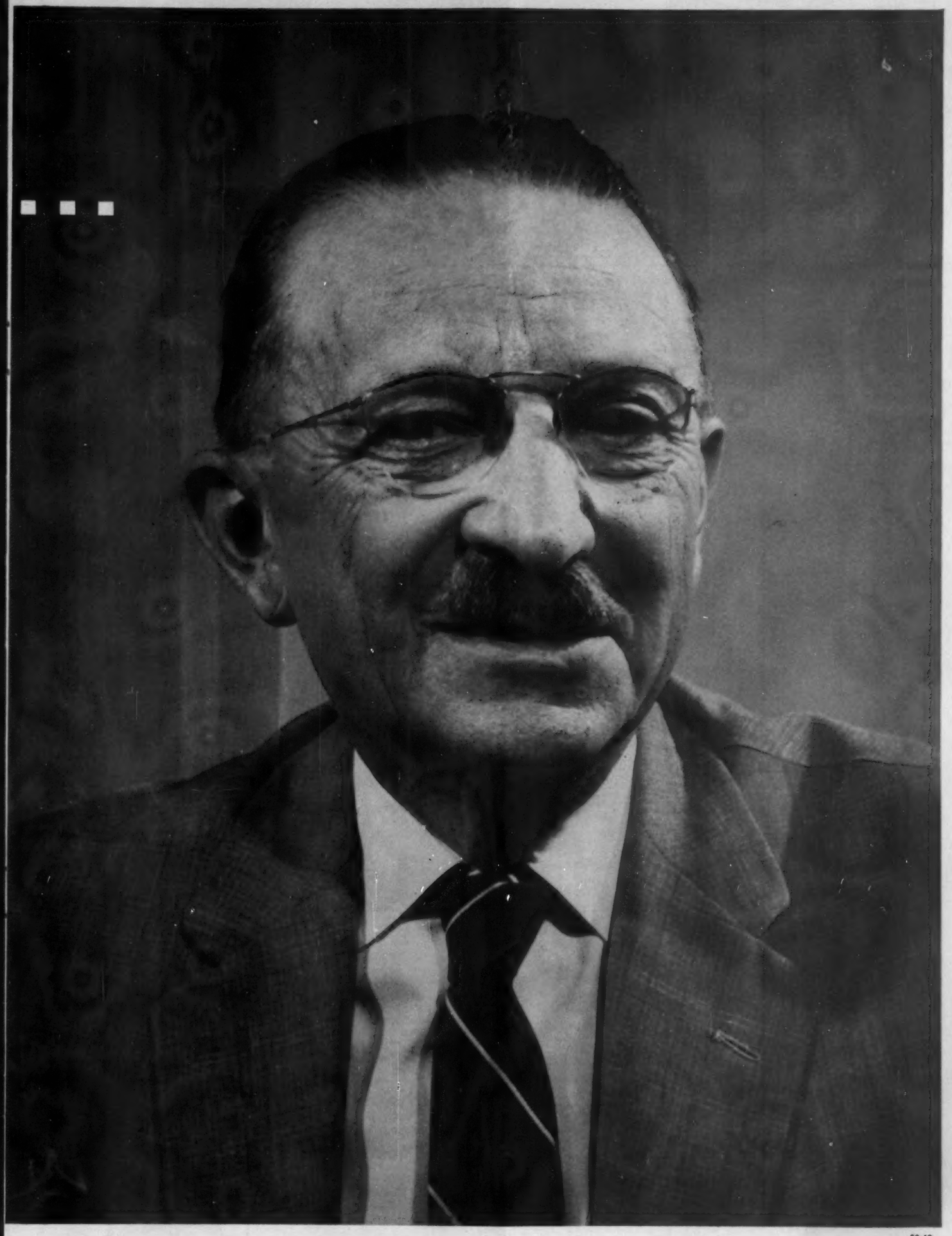
IMC

®Trademark

AGRICULTURAL CHEMICALS DIVISION

INTERNATIONAL MINERALS

Administrative Center — Skokie, Illinois



33-60

& CHEMICAL CORPORATION

MAY AN EMPLOYEE REFUSE WORK IN ANOTHER CLASSIFICATION ?

MISS SMITH, WE NEED YOU IN THE TYPING POOL. WE HAVE TWO GIRLS SICK.
I WASN'T HIRED FOR THAT. I'M A BOOK-KEEPER!
MISS SMITH, WE ARE DISPLEASED WITH YOUR ATTITUDE!
IF I CAN'T KEEP BOOKS, I DON'T WANT TO WORK!
MISS SMITH REFUSED A TEMPORARY ASSIGNMENT!
I'M A BOOKKEEPER. I WASN'T HIRED AS A TYPIST!
ARBITRATOR'S DECISION
NO, A COMPANY CANNOT FUNCTION IF EMPLOYEES REFUSE TEMPORARY ASSIGNMENTS IN OTHER CATEGORIES.
Based on a 1959 Arizona Decision

California Group Officers

FRESNO, CAL.—James K. Vedder was elected president of the California Agricultural Aircraft Assn.

Other officers elected include Monty Landsiedel, vice president; Wayland S. Fink, secretary-treasurer; James B. French, ex-officio, and Wanda Branstetter, executive secretary.

OFFICERS AND DIRECTORS—The Colorado Agricultural Chemicals Assn. selected officers for 1960 during the group's ninth annual meeting in Denver, Jan. 28-29. From left, E. H. Macomber, Boulder, American Cyanamid Co., president; Leonard R. Everett, Denver, Woodbury Chemical Co., immediate past president; D. E. Garrison, Greeley, Balcom Industries, Inc., vice president; Howard M. Lair, Eaton, Selco Supply Co., director; and Frank J. Randall, Grand Junction, C. D. Smith Co., director. Not present for the picture was Irwin C. Elliott, Littleton, representing the Chemagro Corp., who was elected secretary.

HIGH-K

MURIATE OF POTASH for the PLANT FOOD INDUSTRY

THIS symbol stands for high-grade uniform, coarse and granular Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

[illegible] BROADWAY • NEW YORK [illegible]

Colorado Association Elects 1960 Officers

DENVER, COLO.—E. H. Macomber, Boulder, was elected president of the Colorado Agricultural Chemicals Assn. during the group's ninth annual meeting in Denver, Jan. 28-29. Mr. Macomber, an American Cyanamid Co. representative, succeeds Leonard R. Everett, Denver, of the Woodbury Chemical Co.

D. E. Garrison of Balcom Industries, Inc., Greeley, was designated vice president. Irwin C. Elliott, Littleton, representing the Chemagro Corp., was named secretary.

Howard M. Lair of Selco Supply Co., Eaton, and Frank J. Randall of C. D. Smith Co., Grand Junction, were named to the board of directors.

The Agricultural Chemicals Assn. meets annually with members of the Colorado agricultural chemicals clearing committees to study and revise recommendations for use of all types of agricultural chemicals. Members of the clearing committees include Colorado State University scientists, agricultural chemicals industry representatives and officials of the Colorado State Dept. of Agriculture and other regulatory agencies.

To New Panogen Post

CHICAGO — Lin Mercil has been appointed North Central regional manager for the Panogen Co. division of Morton Chemical Co., Chicago. This announcement was made by Raymond P. Seven, assistant general manager of Panogen.

Mr. Mercil, who makes his headquarters in Crookston, Minn., has been with the company for the past four years as a sales representative.

In his new position of regional manager, he will direct sales activity in Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, and Montana.

Panogen Co. manufactures seed treatment chemicals, grain and soil fumigants, and rodent repellents.

MORE CUSTOMER SATISFACTION SPREADING PROFITS with the FIPPS SPREADER

- Spreads area up to 40 feet wide.
- Spreads 100 lbs. to 4 tons of fertilizer phosphate or lime per acre.
- Hi-Speed distributor fan eliminates skip spreading.
- Beds are made right and left hand drives for straightline hookup.
- Acid-resistant paint for longer life.
- Heavy treadplate catwalks for extra inspection safety.
- Hoods fold to less than 8 feet for safe highway travel.
- Bed dividers available for split loads.

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CUSTOM BUILT
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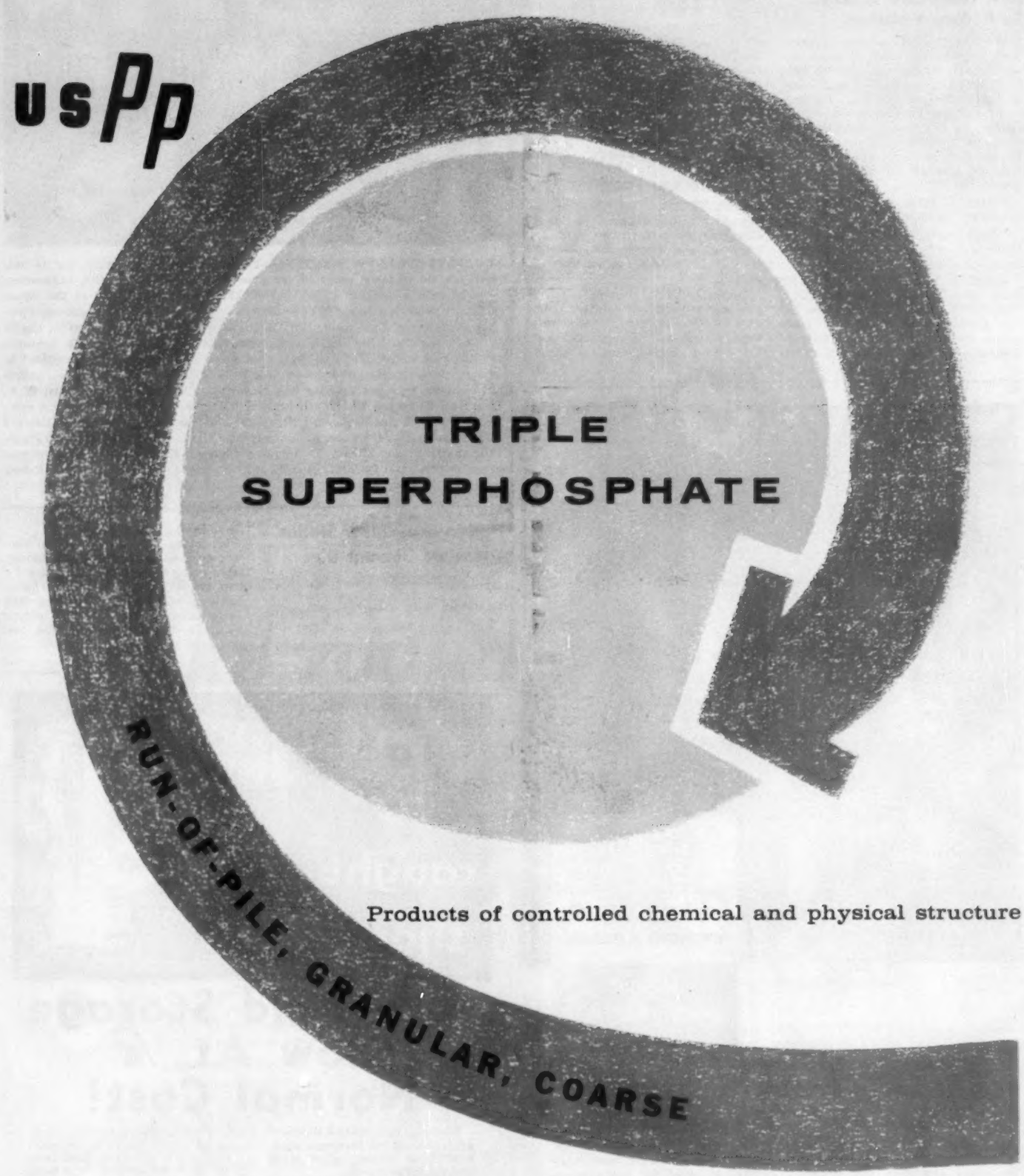

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For scheduling and requirements – Contact our

Sales Agents

BRADLEY & BAKER

U.S. PHOSPHORIC PRODUCTS

TAMPA, FLORIDA

Division

TENNESSEE CORPORATION

New Hampshire Seeks To Reduce Violations

CONCORD, N.H.—Leading spokesmen for the fertilizer industry attended a recent public hearing held in Concord by the State Department of Agriculture and the State Agricultural Stabilization Conservation committee to determine what can be done to reduce violations of New Hampshire's fertilizer inspection law. Officials pointed out that violations are on the increase.

Perley I. Fitts, agriculture commissioner, declared:

"There appears to be unusual delinquency—not just a few cases, but more than usual."

Joseph A. Horn, ASC executive officer, said fertilizer deficiencies had been noted for several years, but that the situation had reached a point where his organization may have to take steps to protest against shortages on the 6,000 to 8,000 tons a year which it helps to furnish farmers.

Dr. Vincent Sauchelli, National Plant Food Institute, spokesman for the fertilizer industry, presented the views of fertilizer manufacturers. He said it was difficult to hold mixtures of fertilizers to exact proportions in every bag and declared the industry makes every effort to give the farmer his full dollar's worth.

New Storage Facilities

POCATELLO, IDAHO—The new storage facilities at the J. R. Simplot Company phosphate plant near here are now under construction, according to Bill Brissenden, public relations official.

He said the $2 million expansion program started last summer is now about 80% completed. The company expects a production increase of 50% this year, he added.

SUPERINTENDENTS' MEETING—Virginia-Carolina Chemical Co. is emphasizing its training program for plant personnel and, in this connection, recently held a meeting of key personnel at Cincinnati, Ohio. In the above photo are seen (left to right): Joe Edge, Memphis; C. A. Allen, Jackson; Clarence Barker, assistant to manager, Richmond; Mack Tune, Jasonville; Curtis W. Cox, manufacturing manager, Richmond; W. C. Thomas, Nichols; Schuster Griffith, Cincinnati; Hugh Griffith, Remington; Doug Laird, vice president in charge of purchasing, Richmond; Tom Rutledge, Orrville; Phil Stone, assistant to manager, manufacturing department; Jim Hammack, Cincinnati; W. L. Hampton, Dubuque; W. W. Huggins, Wilmington; A. P. Gates, general sales manager; Mack Adamson, East St. Louis; Joe Mathews, Wilmington; Edward Adams, company controller, Richmond; Don Allen, Shreveport; Howard Dunn, Cincinnati; Frank Moore, Estherville; Charles T. Harding, executive vice president; Graham Burnett, general superintendent, Richmond; George Eversman, Jr., Ft. Wayne, Ind.

Florida Experiment Station Associate Director Dies

GAINESVILLE, FLA.—Dr. Roger W. Bledsoe, 52, associate director of the University of Florida Agricultural Experiment Station, died suddenly at his home in Gainesville Jan. 24 following a heart attack.

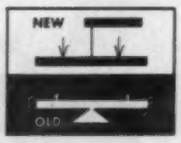
He joined the Florida staff in September, 1943, as associate agronomist, later going to Cornell University for two years. He rejoined the Florida Agricultural Experiment Station staff as agronomist in 1947, and became assistant director June 1, 1954, and associate director July 1, 1955.

PHOTO COURTESY OF ALLIED MILLS, INC.

THAYER SCALES'

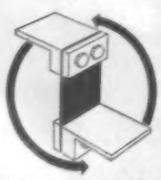
consistent accuracy gives you weight security without wasteful overfilling of bags. Thayer Filling Scale, Model 2N18CC, pictured above, fills 50 lb. bags at high speeds reliably and with sustained precision. In addition, when filling materials are changed, the scale is easily adjusted by one simple control.

Write for our new Filling Scale Bulletin and the name of your local Thayer sales and service representative.



The heart of all Thayer weighing systems is the "Thayer Flexure Plate" Leverage System* which is guaranteed completely accurate for the life of the scale. There are no knife-edge pivots to wear down, therefore neither dirt nor vibration affect its high accuracy. The Thayer system is unsurpassed in design simplicity and in reliability even under the most rugged conditions. It is ideal for filling, batching and checkweighing applications.

*PATENTED



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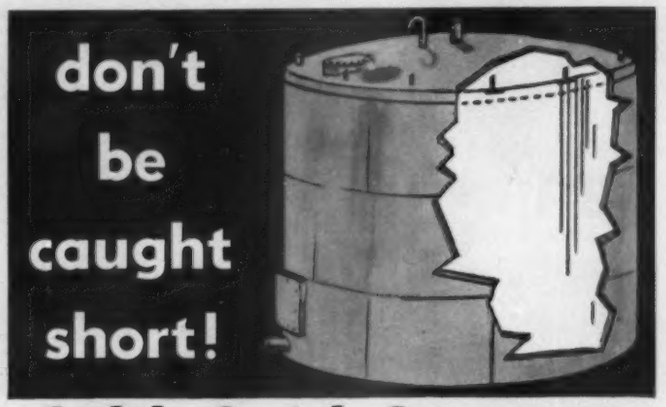

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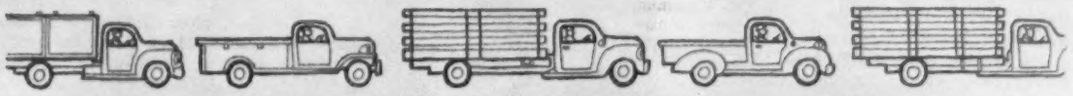
Arcadian® News

Volume 5 | For Manufacturers of Mixed Fertilizers | Number 2



ARE YOU READY FOR THE SPRING RUSH?

The spring rush is just ahead! Every indication points to another big fertilizer year, with your sales dependent on how fast you can get the tonnage out. Right now is the time to take steps to make sure that your plant and operation is in shape to keep mixed goods moving. Plan, schedule and repair now to avoid slow-downs, break-downs and stoppages later.

To do the best job of preparing for the spring season, concentrate on three areas: *your dealers and their customers, your inventory,* and *your production.*

Urge Early Delivery

Do your best to convince dealers and farmers to stock up in advance of actual need. Point out that it's better to have fertilizer stored in the barn or warehouse when needed than to be at the mercy of rush season deliveries. Dealers should encourage farmers to determine and order their various analyses as far in advance as possible. By the same token, you, yourself, should order raw materials so that they are on hand *before* you need them. This will assure your having the right supplies—especially those materials that might become short during the spring season.

Make it a point to urge dealers to put in bulk handling equipment, and suggest that they have a fast means of loading customer's orders during the inevitable rush period. Make a dealer survey to determine what grades and amounts will be needed. Try to get some idea of how much will be in bags, how much in bulk.

Boost Your Inventory

Fill your inventory to capacity. As insurance, take additional warehousing facilities in areas of heaviest springtime demand. When the rush is on, some misguided manufacturers run their plants at night and bag and ship during the day. This can result in delivering a product that is not well-cured. So, get as much storage as possible for your bagged fertilizer.

Eliminate Shut-Downs

Of course, all the planning and scheduling on behalf of inventories, product demands and storage, raw materials, etc., are to no avail when production falters and stalls during the spring rush. But, fortunately, by taking precautions now, costly breakdowns and tonnage-cutting slow-downs can be avoided. Look for these key "troubles"... apply the preventive maintenance indicated:

Frozen air lines—Air compressors deposit a lot of water during steady operations, and if this water freezes, it could plug or crack air lines, or damage the compressor itself. Some plants have lost a whole day correcting frozen airlines. ***How to prevent:*** Drain air lines frequently. Avoid low pockets when installing lines. Observe the precautions against applying heat to nitrogen solution equipment.

Valve diaphragm failure—Leaking inlet valves can cause bad working conditions, foul the mixer, and contribute to poor condition of the fertilizer. There have been some baffling and costly cases of low analysis where the valve ahead of the measuring tank leaked only during the time solution was being forced into the mixer. Pressure was strong enough to return some of the solution to the railroad car, and it was impossible to see this happening. ***How to prevent:*** An inlet valve leak can be discovered by watching for any change in the liquid level of the measuring tank while the tank has its maximum operating pressure with no solution valve open. Valve diaphragms should be replaced as routine procedure well before failure might be

expected. This preventive maintenance is well worth the small cost involved.

Clogged gauge glasses—Restricted flow in gauge glasses causes almost all of the faulty proportioning that occurs as materials flow through measuring tanks. ***How to prevent:*** Keep *all* gauge glass connections free and open by removing the plugs and cleaning the passages with a wire brush and water. Any "creeping" of the level in a gauge glass after the valves are closed indicates clogging and should be the signal for immediate cleaning. Also, producers should see to it that gauge glasses are protected from accidental breakage, and that spare glasses are kept on hand.

Leakage to and from batch mixers—A long list of troubles stem from leakage of materials into or out of batch mixers. These troubles include: excess fumes, faulty analysis, and even fires where substantial quantities of sulphuric acid and nitrogen were used. ***How to prevent:*** Check mixer inlet and outlet doors regularly for leakage and wear of operating mechanism.

Fouled rotary mixer—It's quite common for the rotary mixer to get so fouled between the flights that it neither mixes nor discharges on schedule. Under such conditions, proper ammoniation becomes impossible. Many factors contribute to this fouling, especially these three:

1. **Adding nitrogen solution or acid to the mixer when only superphosphate is present.** Even if distributor pipes were correctly drilled to accommodate the unusual density pattern in the mixer under these conditions, the mass would still be excessively sticky from heat and probably moisture—especially where damp superphosphate and nitrogen solutions with relatively high moisture content are used. ***How to prevent:*** Have *all* of the dry ingredients in the mixer before adding nitrogen solution or acid.
2. **Adding nitrogen solution to the dry ingredients as they enter the mixer.** This not only fouls the mixer, but also contributes to poor working conditions, and lowers the quality of the fertilizer. ***How to prevent:*** As above, put all the ingredients into the mixer *first*—then add the liquids.
3. **Solution or acid leakage into an empty batch mixer.** Such leaks prepare the surfaces of the mixer for rapid build-up and quick corrosion. The trouble may be in leaking valves, or in long runs of piping from the measuring tank or meter to the mixer. ***How to prevent:*** Fix leaking valves. Install an air purge in a long run of pipe to make sure that all the solution enters the mixer during the mixing cycle.

Mis-use of withholding hopper—Where producers foolishly leave the gate of the withholding hopper open at all times, allowing materials to flow directly into the mixer, trouble is inevitable. Among the problems this can cause are: Faulty analysis, poor condition, and excessive fumes. ***How to prevent:*** Use the hopper as it was intended to be used.

Failure to rehandle—Although rehandling of pulverized goods to improve physical condition is generally practiced, a few producers try to eliminate this step in the spring. It usually turns out to be a costly shortcut. ***How to prevent:*** *Always* rehandle pulverized goods.

Common granulation troubles—Producers who turn out granulated goods usually run into these problems: failure to get granulation started, drop-off of granulation after it has started, fouling of the mixer and dryer, overloading of the hammer mill, blinding of screens, excess of moisture and heat in the stored product. Also, fires in the mixer continue to cause delays, as well as jeopardize safety. ***Some preventive measures:*** Many operators shorten start-up time by warming the equipment as far ahead of start-up time as practical, and by starting with about the same amount of recycle that experience has shown to be normal . . . Regulated recycle aids smooth operation about as much as any one factor in granulation . . . By starting a little on the dry side and gradually building up to the desired liquid phase, the prospects of fouling equipment early in the day will be greatly minimized.

Premature granulation in the ammoniator—If it is continuous, premature granulation can contribute its share of production slow-downs. Some of the causes are excessive use of sulphuric acid, combined with high ammoniation rates—especially with the "wetter" acids and nitrogen solutions. Of course, in some cases, this may be deliberate, to obtain the heat that promotes granulation. ***How to prevent:*** Two of the best ways to curb premature granulation is to use materials with low moisture content and provide for uniform recycle.

Excessive use of acid—Faulty ammoniation equipment or techniques will lead to use of overly large quantities of acid to take up the ammonia that is not reacted with the superphosphates. ***How to prevent:*** Make daily inspections of all liquid distributing equipment.

Inadequate dryer operation—Where

Scrubbing Assures Clean Cars for You

Washing and inspection of Nitrogen Division tank cars before reloading with Nitrogen Solutions for delivery to you is a standard part of Nitrogen Division service. Here a string of tank cars enters the wash rack station.

rotary dryers do not perform as well as they should, excess acid in some units is expected to do much of the work of the dryer in granulation and drying. This is particularly true with a counter-current dryer that is inadequate. Here there is too little hot air being forced through the length of the dryer. This usually happens because an enormous amount of air leakage at the fertilizer inlet end causes air to leak directly to the suction fan, thus by-passing the burner end of the dryer. Failure to correct this leads to excess moisture in the stored goods—with all the troubles that this condition can impart to fertilizer. ***How to prevent:*** Eliminate air leakage. Also, check fan blades, air ducts and dust collectors for build-up that restricts air flow.

Excess fines—Damp fertilizer quickly blinds the screen, which results in too great a quantity of fines delivered to the pile. This will influence the amount of recycle in many systems. ***How to prevent:*** Check your fines screen—it may be too fine for the grade you are producing. Also, check your procedure to see if you can produce less fines.

Semi-granulation troubles—Producers sometimes find that their semi-granulated goods do not hold up as well as expected. This could be the result of inability to hold the moisture content to a trouble-free level at all times. Also, shut-downs in semi-granulations may be caused by failure to get desired granulation . . . or by fouling of equipment, particularly the mixer, and, at times, the bucket elevators. Operating conditions are frequently near the point where fouling is an ever-present threat, and some adjustment may be necessary to compensate for the variables found in materials, plant temperatures, weather, etc. Since semi-granulation production *is* so sensitive to so many variables, operators must be very alert and adhere strictly to correct operating procedures. If they prove careless, there is a real danger of fires breaking out in the mixer. ***How to prevent:*** Every effort should be made to permit discharging the mass as early and as quickly as conditions demand.

Ask Nitrogen Division

Your Nitrogen Division technical service man is familiar with methods and materials that speed production of good-quality mixed fertilizers. Getting his advice and assistance now may help you to mix and ship more tonnage during your peak period. This service is available to customers without charge. Simply contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.

HOW WE PROMOTE YOUR PRODUCTS

This year, as every year, Nitrogen Division is stressing the importance of a balanced fertilizer program in crop production. The typical page advertisement shown here, which appears in leading farm magazines, shows how the ARCADIAN® Ammonium Nitrate campaign features the teamwork of mixed fertilizers and nitrogen top-dressing or side-dressing.

This consistent policy of emphasizing the need for mixed fertilizers makes this Allied Chemical campaign the "perfect partner" for your own promotion and sales program. Here's what the lead-off copy in this page advertisement says:

"Team these Two for Big Yields"

"To make vigorous, healthy growth and produce abundant yields, all crops require a balanced fertilizer program. Mixed fertilizers are the most efficient way to supply the plant food needs of your crops. . . . For the most profitable yields, use plenty of mixed fertilizer, and when your crops need extra nitrogen, use genuine ARCADIAN Ammonium Nitrate."

The balance of the sales message also sells mixed fertilizer in statements such as these:

"Plowed down and in the row, mixed fertilizers save time and labor in feeding your crops several needed plant foods in one application."

"ARCADIAN Ammonium Nitrate works in perfect partnership with mixed fertilizers to make your crops produce bigger yields and profits."

"Make sure you use plenty of mixed fertilizers and when you need extra nitrogen, always buy ARCADIAN!"

Yes, Nitrogen Division, Allied Chemical, is constantly featuring your mixed fertilizers in its own advertisements to your customers, the farmers. This is only one of many valuable services Nitrogen Division provides. Call Nitrogen Division when you need nitrogen materials and service.

HERE'S THE BIG LINE OF Arcadian NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
[illegible]	82.2	99.9	—	—	—	24.3	0.618	211	-108

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

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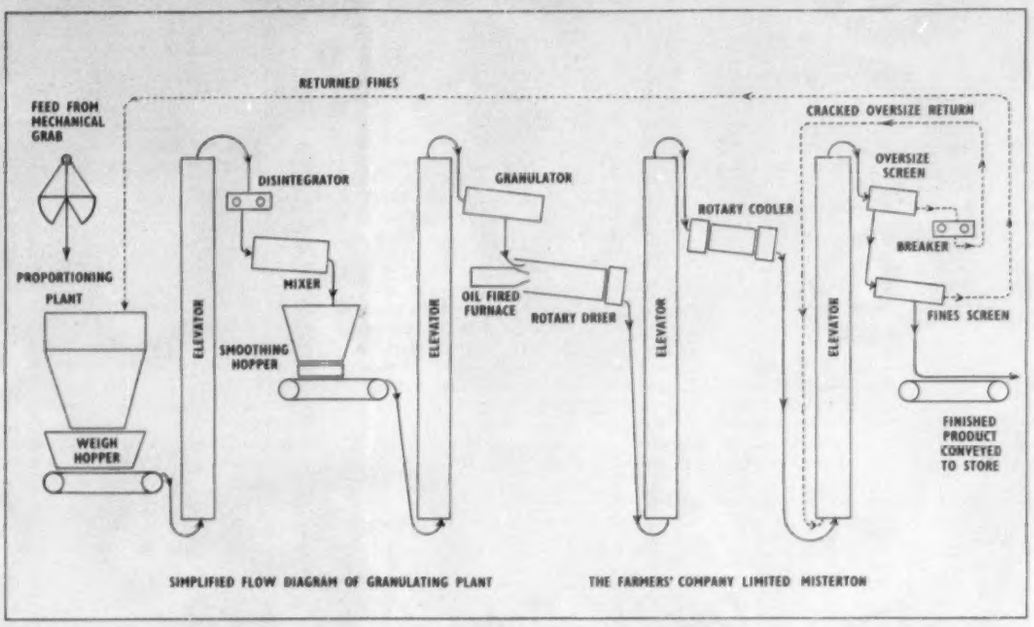
St. Paul 14, Minn., 764 Vandalia St. ..... Midway 5-9141
San Francisco 4, Cal., 235 Montgomery St. ..... Yukon 2-6840

British Phosphate Plant in Operation

By Leo Walter
Consulting Engineer
Gloucester, England

Figure 1—Simplified Flow Diagram of British Granulating Plant



A NEW PLANT has been erected recently by the Farmer's Co., Ltd. in Nottinghamshire, England, for the manufacture of granulated compound fertilizers. Known as the Stockwith Works, the modern facility occupies 6 acres of ground with a factory area of 50,000 square feet.

Superphosphate is manufactured at another factory at Barton-on-Humber. The raw materials are phosphate rock which the firm imports from North Africa. Sulphuric acid is manufactured on site.

The new plant has had the advantage of the experience gained at the company's other works so far as its layout is concerned. The whole process, from raw material to finished products, is one of progressive movement.

Raw materials are brought in by barges to the riverside berth, where they are unloaded to storage by a traveling overhead crane. From storage the raw materials are fed into a proportioning and weighing plant from which, after weighing, they are conveyed to the granulating plant where they are pulverized, mixed and granulated. The desired end product is finally screened to size and conveyed to storage for ultimate bagging.

If any one step in the process deserves to be called unique, it would be the proportioning and weighing system, built to the com-

Figure 2—Flow diagram for dihydrate phosphoric acid process

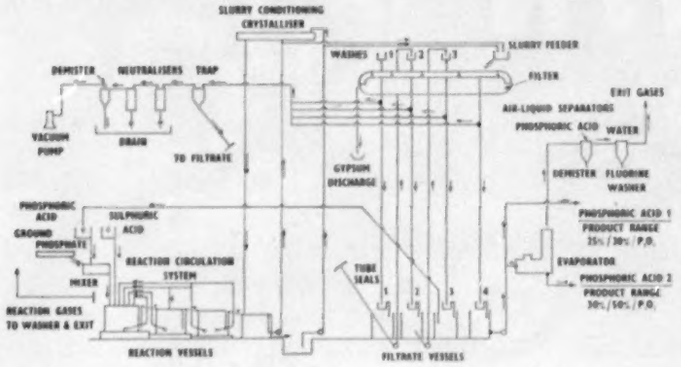
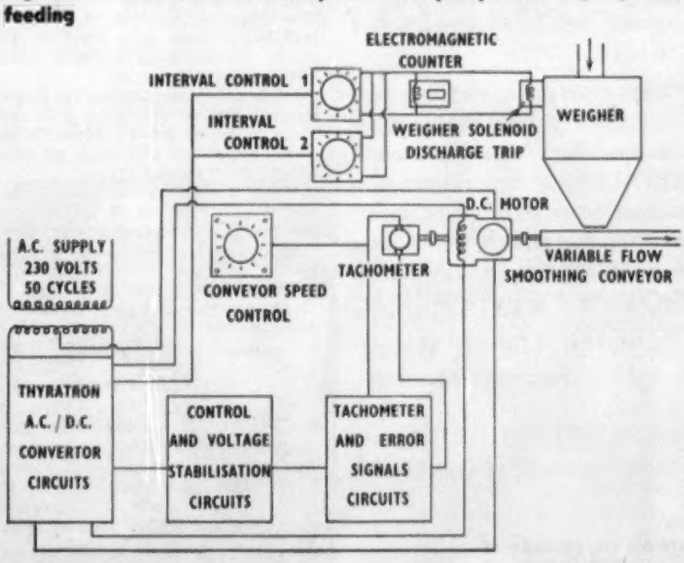


Figure 3—Electronic control system for phosphate weighing and feeding



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For Insecticide Carriers, Diluents

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USE THIS CENTRALLY LOCATED SOURCE OF HIGH QUALITY, LIGHTWEIGHT MONTMORILLONITE CLAY FOR SAVINGS ON SHIPPING COSTS

This high grade clay is available in a variety of textures to meet specific needs.

SAMPLES AND PRICES WITHOUT OBLIGATION

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Send samples and data on CREEK-O-NITE:

☐ Dust ☐ Granules ☐ Fines.

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pany's own design. This system is the heart of the whole process, enabling, as it does, the concentration of the various raw materials required so that each can be fed in the desired quantity to the granulating plant.

The system consists of six raw materials storage hoppers; one being for the recycled process fines, the other five being fed by an overhead crane. Situated at the bottom of the hoppers are rubber conveyor belts push-button operated by a weighman.

In operation, the weighman selects the raw materials from the hoppers as desired. At each selection, the raw material is discharged into the hopper of the weighing machine, the accumulative weight being indicated on a dial. When a complete batch is weighed off, the operator presses another push-button which actuates electric thrusters attached to the gates of the weigh hopper, allowing the batch to proceed to the granulating plant. It is of note that only two men are involved in the above operation: the weighman and the operator of the overhead crane.

This is a new process for the production of high-analysis concentrated compound fertilizers. As such, compound fertilizers containing calcium superphosphate were first granulated in measurable quantities in the early 1940's. The processes developed depended on the physical properties of the superphosphate for the binding of the granules.

Superphosphate, sulfate of ammonia and muriate of potash were the usual fertilizers to be mixed and granulated by controlled wetting and manipulation. Cold water was generally used in the wetting stages of the processes, although both hot water and steam were used in work done in the late 1930's, and the advantages of the preheating of the powder mixture observed.

With the above substances and using cold water in the granulator, operating conditions existed which permitted visual granulation control of the mixture before feeding to the dryer, the controlled heating having no appreciable effect on the chemical or physical natures of the ingredients.

When ammonium nitrate was substituted in part for ammonium sulfate (1943), visual control at the granulator became impossible when using cold water. This was because of the greatly increased solubility of ammonium nitrate in hot water, and was countered by "underwatering" in the moderate temperature of the granulator.

When using ammonium nitrate, or other salts with similar solubility characteristics, visual control of granulation was restored by raising the temperature of the mixture in the granulator by the use of steam or heated gases.

In cold granulating, water is required first for wetting (dependent on surface area, surface tension and the temperature of the crystals), and secondly, in excess of this for efficient granulation with the superphosphate in the existing conditions. For granulation in a rotary conditioner, this quantity is approximately one-seventh of the water which would be required to completely dissolve the weight of crystals in question at a temperature of 100° C.

By the new process (F.C.L. Compound Fertilizer Process, B.P. No. 791004), however, the company says it is now possible to manufacture granulated, concentrated, mixed fertilizers containing plant food ratios of over 2.5:1 nitrogen (N) to phosphorus (P) and 2.5:1 potassium (K) to phosphorus (P). On this basis, fertilizers containing up to 50 plant food units have been produced. This is a hot granulation process with visual control.

A feature of the new method is that dihydrate process phosphoric acid can be advantageously used as produced at the acid-plant filters. The sulphuric acid normally present in technical phosphoric acid is at times sufficient for the needs of the granulation process. The phosphoric acid is produced at the company's Barton-on-Humber works.

A 10-ton-per-hour fertilizer granulating plant of orthodox design is now in the course of being extended at the company's Barton-on-Humber works to work according to the new process. The detailed design of this plant and a unit for the continuous ammoniation of phosphoric acid has been put in the hands of the Sturtevant Engineering Co., Ltd., London, working in cooperation with the Farmer's Co., Ltd.'s technical staff.

The Barton-on-Humber works, at which the manufacture of fertilizers has been carried on without a break since 1873, has been the site of many original developments, as in 1942 the company installed a granulating plant and was among the first to produce granular fertilizers.

In 1953, a phosphoric acid plant was installed to enable the company to manufacture triple superphosphate for use in concentrated compound fertilizers and here, also, the first fertilizers in Great Britain containing the insecticide aldrin were produced and offered commercially.

Bag Firm Shifts Texas Sales Responsibilities

NEW YORK—West Virginia Pulp and Paper Co. has announced it is now processing all orders for multiwall bags formerly handled by the Dallas office, directly through the New Orleans bag plant of its multiwall bag division. As a result of this move, the company's Dallas office has been closed.

Sales representatives previously working out of this office will continue to cover the states of Texas, New Mexico and Oklahoma as heretofore, the company says.

These representatives are located in Texas and include H. D. Laney of Ft. Worth, J. A. Schoenstein of Houston, A. M. Strickland of Lubbock and O. E. Wilson of Richardson.

The company's multiwall bag division operates four bag plants located in New Orleans, Torrance, Cal., St. Louis, Mo., and Wellsburg, W. Va.

FLORIDA SALES

TALLAHASSEE, FLA.—Fertilizer sales in Florida for December, 1959, amounted to 210,353 tons, reported Nathan Mayo, commissioner, Florida Department of Agriculture. This total broke down into 73,561 tons of materials and 136,792 tons of mixed fertilizers.

Dealers and formulators agree DETHMOR® WARFARIN makes rodent baits more effective *and* more profitable.

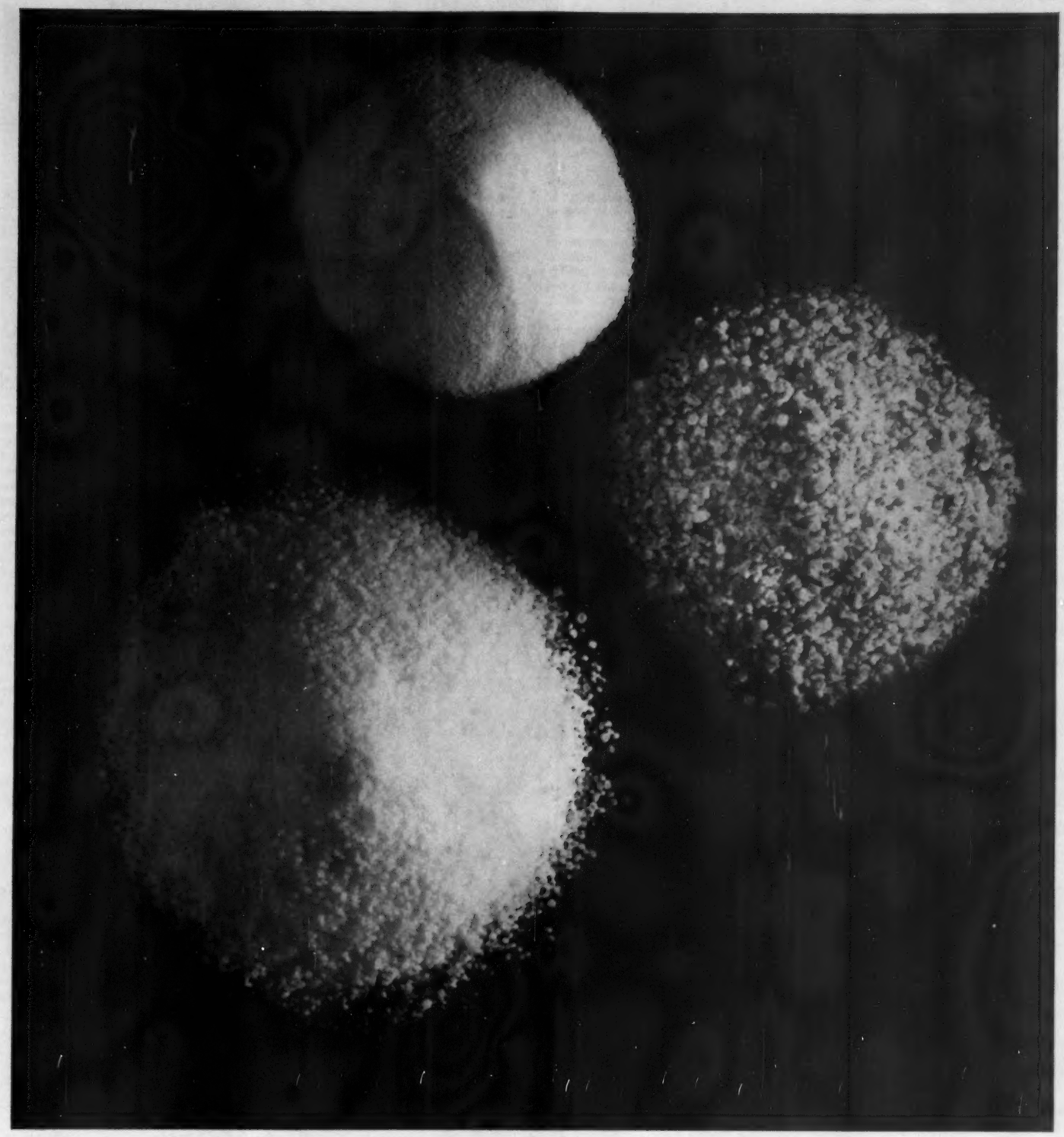
Eleven years of farm magazine advertising have established WARFARIN as the world's most famous rat and mouse killer. Tasteless, odorless, painless . . . WARFARIN is economical and completely effective. Rats never become bait shy or build tolerance. It's safe, too, . . . won't harm children, pets, or livestock when used as directed.

Feature, promote and sell WARFARIN baits *now* . . . while WARFARIN's national program is in full swing!

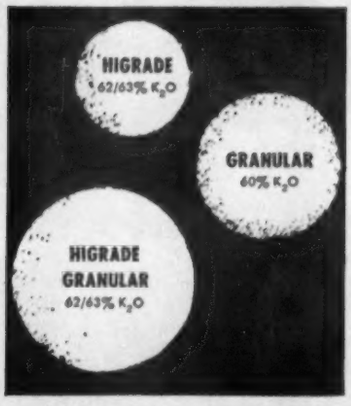
PENICK

Farm Chemical and Insecticide Division

S. B. PENICK & COMPANY • 100 CHURCH ST., NEW YORK 8 • 735 W. DIVISION ST., CHICAGO 10



To help you make better fertilizers... three grades of specially-sized potash



Muriate of potash ideally sized to meet your fertilizer manufacturing requirements. For mixed fertilizers, you get most potash per ton from our two white grades—Higrade muriate, and Higrade Granular muriate—each contains 62/63% K_2O. For fertilizers requiring a larger particle size, choose our Granular muriate containing 60% K_2O. All three grades are specially refined to resist caking and remain free-flowing. The particle sizes are uniform.

Complete technical data, samples, and accurate shipping information will be furnished promptly by our expertly staffed Technical Service Department on request.

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Basic Producers of Potash and Borates for the Fertilizer Industry

UNITED STATES POTASH · PRODUCT OF NEW MEXICO U.S.A.

MEMBER: AMERICAN POTASH INSTITUTE

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Hercules Purchases Rhode Island Firm

Hercules Powder Co. has announced its purchase of assets of the Nitroform Agricultural Chemical Co. of Woonsocket, R.I. Nitroform produces urea-formaldehyde fertilizer compounds, now widely used for feeding turf grasses and ornamentals.

Production of urea-formaldehyde compounds under the tradename of "Hercules-Nitroform Blue Chip," a granular free-flowing fertilizer, and "Hercules-Nitroform Powder Blue," a wettable powder designed for liquid application, will continue at Woonsocket, with additional facilities at Hercules, Cal., expected to be on stream by July of this year.

The use of urea-formaldehyde fertilizers, known as "urea-form," has been growing steadily during the past few years. Relatively insoluble in cold water, urea-form compounds are said to provide a long-lasting and more controlled release of nitrogen than conventional fertilizers. Because of this controlled release, in most sections of the country one application of urea-form fertilizers makes plant nutrients available throughout the entire growing season.

Sprout-Waldron Appoints William H. Alsted

MUNCY, PA.—The appointment of William H. Alsted as sales representative for northern Idaho, Washington, Oregon and British Columbia has been announced by Sprout, Waldron & Co., Inc. He joined Sprout-Waldron in 1954, after eleven years with the Alsted Manufacturing Co. of Truesdell, Wis. Mr. Alsted studied engineering at the University of Alabama from 1938 to 1942.

Personnel Changes By Norkem Corp.

YAKIMA, WASH.—Norkem Corp. has announced the advancement of Glen M. Chambers to assistant general manager. Mr. Chambers, who formerly operated Chambers Aviation in Yakima, has been associated with the agricultural chemical field for the past fourteen years. He joined the Norkem staff in 1958 and since that time has been in charge of the areas of eastern Washington, northern Oregon and Idaho.

Other recent changes in the Norkem staff include the addition of three more sales representatives. W. C. (Bud) Carter of Grandview will be active in eastern Washington and northern Oregon. Richard Bailey takes over territories in northern Idaho and eastern Washington. Jack Van Horn of Grandview will be active in the diversified crops section of the lower Yakima Valley.

Gordon B. Ough

NEW APPOINTMENT — Gordon B. Ough has been made assistant Canadian manager of Agricultural Chemicals, Ltd., Cobourg, Ont. He brings to his new position 21 years' experience in the Canadian fertilizer field. Company plants are located in Port Hope, London and Orangeville, Ont., and Fort Chambly, Que.

Texas Gulf Sulphur Plans New Filtration Plant

HOUSTON — Texas Gulf Sulphur Co. has disclosed plans for construction of a plant for the treating of sulfur by filtration to be located at its Spindletop mine near Beaumont, Texas. The plant is expected to cost about $1 million. It will operate in connection with nearby shipping facilities at the company's new Neches River terminal.

A contract for the construction of the plant has been awarded to Consolidated Western Steel Division of U.S. Steel Corp. Construction is due to begin about March 1.

Texas Gulf produces both bright sulfur and dark sulfur. According to Claude O. Stephens, president, the plant is designed to treat the dark variety and provide from this material sulfur of higher and more uniform quality.

Completion of the new plant is scheduled for mid-summer of 1960. No new operating personnel will be required, the company said.

National Safety Council Assigns Staffer to NSC Fertilizer Section

CHICAGO — Appointment of Marshall E. Peterson to be staff representative of the National Safety Council for its fertilizer section has been announced by NSC. In addition, he will be staff engineer for the National Safety Council's meat packing, tanning and leather products section. Mr. Peterson has a bachelor of science degree in safety and fire protection engineering from the Illinois Institute of Technology and has also attended the Traffic Institute of Northwestern University and the fire training school of Ansul Chemical Co. He is a member of the American Society of Safety Engineers and the Greater Chicago Safety Council.

M. E. Peterson

Mr. Peterson was to meet with the executive committee of the fertilizer section at its mid-winter meeting at Lakeland, Fla., on Feb. 4, according to S. M. McCargo, GLF Soil Building Service, Ithaca, N.Y., of the fertilizer section executive committee.

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DIELDRIN 50-DB
DIELDRIN 50-W
ENDRIN 50-DB
ENDRIN 50-W
HEPTACHLOR 25-DB
HEPTACHLOR 25-W
KARATHANE 25-W
LINDANE 75-W
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Niagara Chemical Division Reorganizes Its Entire West Coast Manufacturing Operation

MIDDLEPORT, N.Y.—A major reorganization of its Western operations has been instituted by Niagara Chemical Division of Food Machinery and Chemical Corp. This was indicated by Stuart H. Bear, the division's manager, in announcing formation of the Western agricultural department.

"With headquarters in Fresno, Cal., the new department is designed to provide more efficient operation—hence improved over-all service and faster distribution of products and technical information," Mr. Bear said. He added that the move was necessitated by expansion of Niagara's West Coast activities through the purchase early in 1959 of Sunland Industries, Inc., Fresno.

Until now, Niagara has produced its full line of products for West Coast consumption in Richmond, Cal. and Yakima, Wash. Now, the Fresno plant, formerly operated by Sunland, will bring expanded production of some pesticides plus initial entry into seed and fertilizer production for the company, a spokesman said.

Niagara's Western agricultural department will be managed by L. M. Duckworth. It will comprise four regions, each directed by a manager and having a central office. The newly appointed regional managers and their respective office locations are: James H. Molich—Fresno; Rolf Haasarud, Richmond, Cal.; James Southwick, Anaheim, Cal.; and William Castro, Yakima, Wash.

Says Department Manager Duckworth: "Our movement into the Fresno area follows the trend of recognizing the agricultural potential of the San Joaquin Valley. We hope to bring a more complete, well-rounded program of manufacturing and distribution of agricultural chemicals and seeds to this Western area."

The Western agricultural department will serve eleven states in all. These are: California; Oregon; Washington; Montana; Utah; Nevada; Colorado; Wyoming; Arizona; Idaho; New Mexico.

Number of Chemical Workers Declines Slightly

WILMINGTON, DEL. — Employment in chemical manufacturing in Delaware showed a decline of 100 workers in December. The employment level was estimated at 27,000, compared to 27,100 in November and 27,200 in October, according to the monthly report of the Delaware Unemployment Compensation Commission.

However, the number of workers in the chemical industry is 200 higher than December a year ago when 26,800 were employed.

Average weekly earnings of the production worker increased between November and December from $125.55 to $126.99. A gain was noted in average hourly earnings, $3.06 in December and $3.04 in November. An increase was shown in the average work week, 41.5 hours in December and 41.3 in November.

J. Walter Harding

VICE PRESIDENT — J. Walter Harding has been elected vice president, administration, of Federal Chemical Co., Louisville, Ky., the firm has announced. Mr. Harding was also re-elected secretary of the company. He has been with Federal for the past 12 years, having previously held the positions of traffic manager, manager of purchases and for the past year, secretary and controller.

WACA Announces Spring Meeting Plans

SANTA BARBARA, CAL.—The spring meeting of Western Agricultural Chemicals Assn. at Miramar Hotel, Santa Barbara, Cal., March 22-23, 1960, will feature as speakers Dr. Daniel G. Aldrich, university dean of agriculture, University of California; S. H. McAllister, general manager, agricultural chemicals division, Shell Chemical Corp.; and William R. Dixon, general sales manager, The Dow Chemical Co. Dr. F. M. Ashton, associate professor of agricultural botany, University of California at Davis, will discuss "Absorption, Movement and Action of 2,4-D," C. O. Barnard, WACA executive secretary, has announced.

Jim R. Dutton, regional supervisor, plant pest control division, Agricultural Research Service, U.S. Department of Agriculture, will report on "Aerial Spray Programs" and an industry panel will discuss "Marketing Aspects of the Agricultural Chemicals Business."

Clay Bulletin Out

HOUSTON—Availability of its newly published brochure on the manufacture and applications of attapulgite is announced by Magnet Cove Barium Corp. Entitled "Attapulgite Products for Industry," the 20-page publication outlines the uses of the fuller's earth material in agricultural pesticides, and other applications. Much of the brochure is devoted to the properties of the company's attapulgite products processed for use by insecticide formulators and petroleum refineries, including V.M., screen sizes, sorptive capacity, and bulk density. Charts list the granules per pound of the various screen sizes and give typical formulations of various toxicants.

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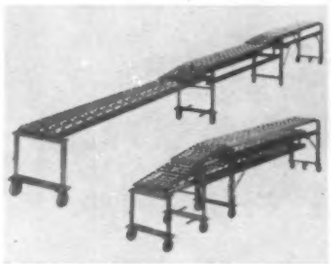
What's New?

Additional information is available about new products, new services, and literature described in this department. Circle the numbers of items on which you desire more information, fill in your name, your job title, your company's name and address on the card. Then clip it out of the page and mail. No postage is necessary.

No. 9192—Gravity Conveyor

The Rapistan Extendible Gravity Conveyor that can be extended from less than 11 ft. to 30 ft. in length, has been announced by the Rapids-Standard Co. Mounted on casters to make it readily portable, the unit is a "nesting" set of three 18 in. gravity wheel conveyor sections designed for use in loading and unloading trucks and for moving materials in-



to stacking areas and in other warehousing applications. When used for loading, the conveyor is extended as far as required into the truck, car or bay. As loading progresses, the conveyor is telescoped gradually until it is fully compressed, if necessary. The unit is also adjustable for height. The loading end can be raised from 34¼ in. to 41½ in., with the unloading end adjustable from 20¼ in. to 27¼ in. For details, check No. 9192 on the coupon and mail.

No. 9195—Scale Data Sheet

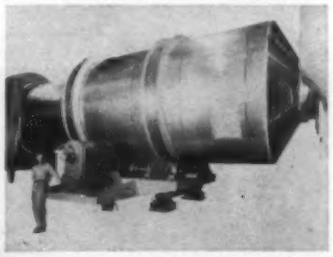
The HHH-38 automatic scale is described in a product data sheet offered by the Richardson Scale Co. According to company literature, the scale processes loads from 200 lb. to 600 lb. per discharge, providing high weighing accuracy and operating with materials such as abrasives, chemicals, feeds, foodstuffs, grains and minerals. The data sheet also contains a list of specifications and optional accessories as well as a scale drawing and photographs. For copies, check No. 9195 on the coupon and mail.

No. 9197—Bag Closing Machine

Crown-Zellerbach Corp. announces the development of the "Crown Thermo-Tape Machine" for in-plant closure of sewn bags with polyethylene-coated tape. The machine heat seals the coated kraft tape to the bag top to stop sifting. The unit, according to the company, fits into the production line in synchronization with the sewing machine. The filled multiwall bag moves into the sewing machine and then passes through the tape machine with no manual assistance. The tape cutting is automatic as is the tape feed mechanism. The tape, with as little as 10 lb. polyethylene coating gives permanent 100% seal against leakage through needle holes. Softened by heat, the polyethylene moulds to the stitch line in a permanent bond, the company says. For details, check No. 9197 on the coupon and mail.

No. 9198—Dehydration Equipment

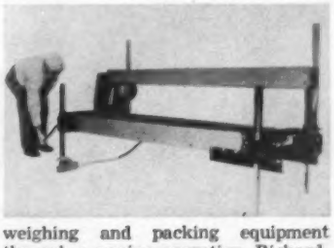
Advanced feedstuffs drying machinery has been announced by Edw. Renneburg & Sons Co. Included in the new equipment is the Renneburg "DehydrO-Mat" dryer, or combination dryer-cooler, and the "Refractoryless" gas-fired air heating furnace. The large and variable dia-



meter of the DehydrO-Mat regulates air flow and controls material velocities; safe drying temperature; longer product retention time; assures gentle handling and drying for heat-sensitive products such as soybean meal, feedstuffs, foods, chemicals and other materials, the company says. It is possible, company literature says, through increased volumetric heat transfer, to dry as much product in a 35 ft. long DehydrO-Mat as is usually dried in a 50 ft. or 60 ft. dryer. Coupled with the unit is the company's refractoriless double shell, air-cooled steel combustion chamber which eliminates the need for insulation and refractories. Complete information can be obtained by checking No. 9198 on the coupon and mailing to this publication.

No. 9190—Flat Belt Conveyor

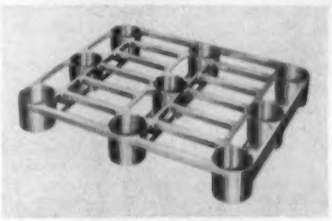
Unique flexibility in bagging operations is provided by a new flat belt conveyor which can be adjusted in height as well as length, officials of Richardson Scale Co. have announced. An adaptation of the Model GA-11 bag conveyor which allows changes in length from 7 ft. to 12 ft., the new unit's standard height of 8 in. can be easily jacked by one operator to any position within a range of 12 in. The new conveyor is designed for all package conveying, and in particular to convey filled bags from



weighing and packing equipment through a sewing operation. Richardson officials pointed out substantial cost savings are realizable by mass producing one standard unit to fit all applications. The adjustable features contribute to simple installation, and when changes in production layout are required, the conveyor is readily adaptable to smaller or larger space requirements. The surface of the belt is absolutely flat since the belt rides on flat metal skid plates. All sizes of bags may be conveyed because there are no obstructions or confining braces. For further information, check No. 9190 on the coupon, clip and mail.

No. 9189—Magnesium Handling Pallet

Mag-Craft Corp. has announced production of a new magnesium material handling pallet which it claims offers numerous advantages over its



counterpart in wood, including drastic weight reduction and increased load capacities in addition to extreme handling ease. Elimination of fasteners and high mortality materials eliminates the pallet maintenance problem. Other features of this pallet, available in aluminum too, are consistent size and weight, reduced load damage, four-way entry, ease of storage, and personnel safety. Mag-Craft's new pallet is available in a variety of sizes to meet the needs of almost any application. For details, check No. 9189 on the coupon, clip and mail.

No. 9194—Brochure On Dryers

General American Transportation Corp. is offering its latest brochure on Louisville rotary drying equipment. The brochure is liberally illustrated and contains sections on how to select driers for various uses, the numerous types available, and photographs of a number of different types. Construction features of several types of driers are illustrated, and a detailed design data sheet is included for the reader wishing to submit the specifications necessary for his material and particular situation. For a copy of this brochure, check No. 9194 on the coupon, clip and mail to this publication.

No. 9193—Automatic Power Shovel

The J. B. Ehrsam & Sons Manufacturing Co. has available an automatic power shovel and tripping unit

Send me information on the items marked:

- ☐ No. 9164—Centrifugal Pump
- ☐ No. 9183—Solenoid Valve
- ☐ No. 9186—Flexible Coupling Bulletin
- ☐ No. 9189—Magnesium Pallet
- ☐ No. 9190—Flat Belt Conveyor
- ☐ No. 9191—Conveyor Belting
- ☐ No. 9192—Gravity Conveyor
- ☐ No. 9193—Power Shovel
- ☐ No. 9194—Dryer Brochure
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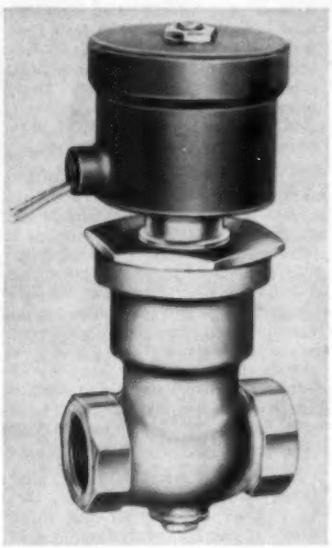
which it claims is safer, easier, faster and more economical for unloading bulk materials from boxcars and trucks. The machine is said to be simple, requiring a comparatively light supporting structure. Also, it has low power consumption and sturdy construction. It is possible, also, to add the Brooks Auto-Trip mechanism to the power shovel. Advantages claimed for the unit include elimination of rope and weight systems of operating the tripping mechanism, speedier unloading and elimination of the hazard of the weights injuring personnel in the event of rope breakage. For details, check No. 9193 on the coupon, clip and mail to this publication.

No. 9183—Solenoid Valve

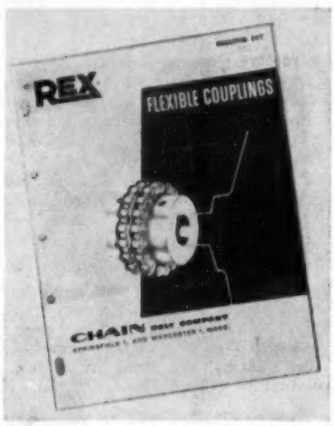
A full-ported, direct-lift solenoid valve with port sizes from ¼ in. to 3 in. and capacity from 0 to 3,000 PSI has been announced by the Atkomatic Valve Co. The 30,000 Series valve, available in bronze or stainless steel, features the Uramic



solenoid that assures reliable operation regardless of line pressures, the company says. The series was designed to meet the demand for positive operation over the entire range from 0 to 3,000 PSI. For complete description, specifications and application data, check No. 9183 on the coupon and mail.

No. 9184—Flexible Coupling Bulletin

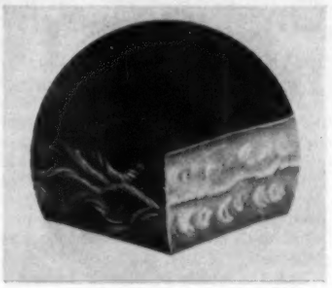
A revised bulletin on roller chain flexible couplings, Bulletin 597, has been published by Chain Belt Co. The bulletin outlines advantages of flexi-



ble couplings. Also contained is information on how to select Rex couplings and it illustrates installation and maintenance procedures. For a copy, check No. 9184 on the coupon and mail.

No. 9191—Conveyor Belting

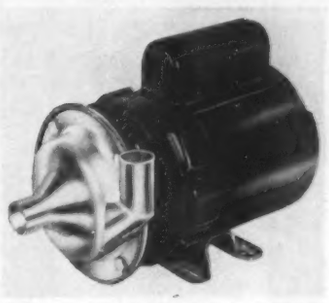
The Russell Manufacturing Co. has announced a conveyor belt made of heavy nylon yarn that is loomed to



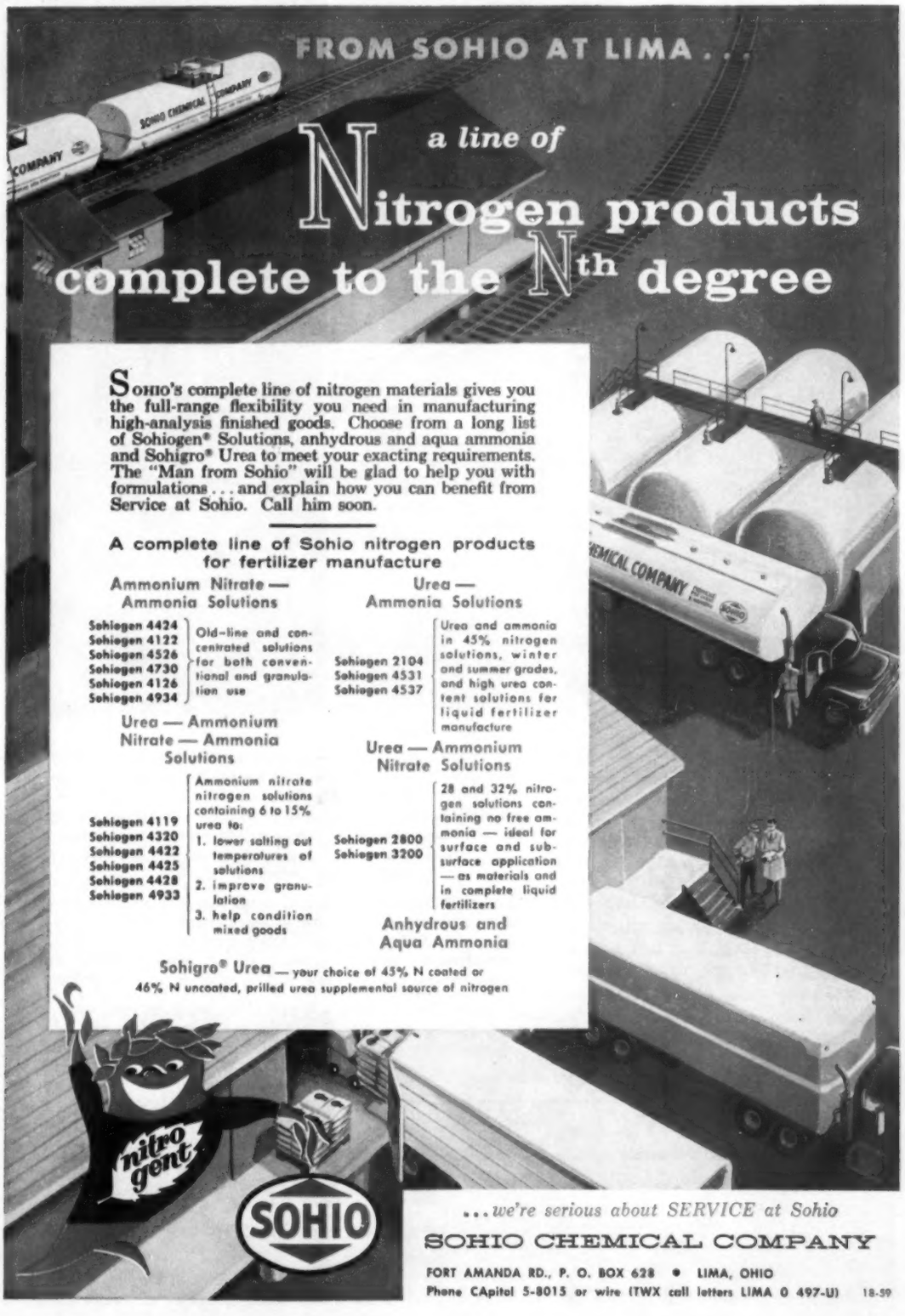
produce a complete belt at one time. The space between yarns is filled with P.V.C. Polyvinyl Chloride plastic. The yarn and plastic combination produces a light-weight, high strength, fire-resistant material, the company says. It is also non-corrosive, non-tearing and abrasive-resistant. For more information about the belting, check No. 9191 on the coupon and mail to this publication.

No. 9164—Centrifugal Pump

A line of centrifugal pumps with a 14 gauge stamped and drawn housing made in corrosion-resistant alloys has been developed by R. S. Corcoran Co. The pump has smooth interior surfaces and configuration to aid high pumping efficiency, the company says. Alloys available include steel, brass, monel, 18-8, 316 and carpenter 20 stainless. Fabrication from titanium, tantalum and zirconium is also available on order. In addition to choice of



alloy, users may specify the impeller design, mechanical seal and style of motor. Pumps are available directly coupled to the "C" flange of the motor, extended from motor flange for high temperature conditions or mounted on a pedestal for shaft coupling or pulley drive. For more information, check No. 9164 on the coupon and mail to this publication.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Old-line and concentrated solutions for both conventional and granulation use
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Urea and ammonia in 45% nitrogen solutions, winter and summer grades, and high urea content solutions for liquid fertilizer manufacture
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Ammonium nitrate nitrogen solutions containing 6 to 15% urea to:
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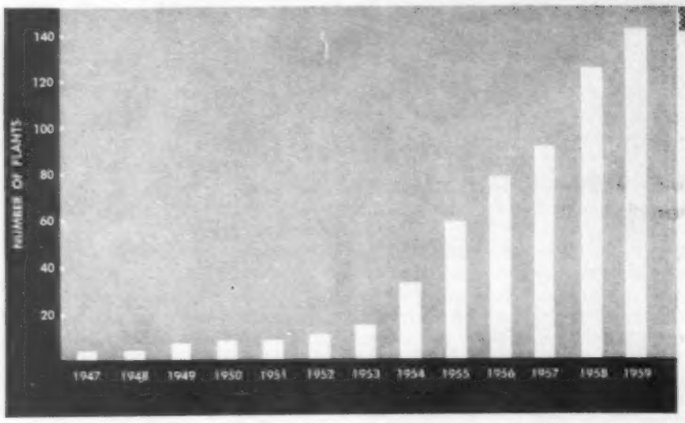

GROWTH PATTERN—The above chart, taken from fertilizer bulk-blending report by the University of Illinois, shows growth in the number of bulk-blending plants in that state since 1947.

Number of Bulk-Blend Plants On Increase in Middle West

BULK BLENDING of fertilizer materials has become a substantial portion of the tonnage of a growing number of plant food manufacturers. Although a controversial process from the standpoint of state control officials who note the tendency of blended materials to segregate in transit or in storage, the blending idea appears to be on the increase.

The University of Illinois has made a report on the blending situation in that state, augmenting a joint survey made earlier by the university's department of agricultural economics in cooperation with the Tennessee Valley Authority.

The report reviews the growth and development of the practice in the Midwest, recalling that the first blending plant in Illinois was built in Woodford County in 1947. "Early growth was slow," the report continues. "By 1953, only 14 plants were operating in the state. Since then, however, the number of plants has increased rapidly. Some 142 plants are now registered in Illinois and additional ones are being constructed."

The report, published in "Illinois Research," issued by the university, said that in 1956, 75 bulk-blending plants in Illinois sold 91,700 tons of straight material, excluding rock phosphate. Some of this was sold unblended, but 62,700 tons, or 68%, were blended. The 91,700 tons represented 27% of all fertilizer materials (excluding rock phosphate) sold in Illinois that year. Thus, about 18% of the total fertilizer sold in the state in 1956 was blended. The Bulletin continues:

A bulk-blender can formulate any material that a soil test shows is needed. Low-cost straight materials are used, and no filler is needed to standardize mixture weight.

To a farmer, the main advantage of bulk-blended materials is their comparatively low cost. Production, transportation, storage, and spreading are all cheaper than for conventionally mixed fertilizers. Bulk-blended fertilizers usually cost about 15% less at the plant than conventional fertilizers containing the same amount of plant food.

The capital investment required for a bulk-blending operation can vary a great deal. Of the three kinds of capital investment needed—land, building, and equipment—land usually takes the least outlay. An adequate site sells for about $1,500. Operators prefer a site with a railway siding, a high-voltage power line, a network of farm roads, and good fire protection.

Structures differ in appearance depending on space needed for blending equipment, number of storage bins, and the arrangement for unloading fertilizer materials from freight cars. Costs of course vary with the type and quality of materials as well as with the size of the building. The range in cost is from $4,000 to $60,000.

Most operators use bulk-loaders for moving fertilizer materials. Bulk-loaders are fast and maneuverable, handling loose materials efficiently in close quarters.

Tractors with loaders are used to a lesser extent for moving materials, as are augers, elevators, and belt conveyors. In many plants belt conveyors are replacing both augers and elevators.

Floor-level platform scales are used if materials are weighed before batching. Suspended hopper scales are used if materials are weighed during batching.

Drum-type mixers are used in most plants. They hold from ½ to 2½ tons of materials and mix each batch in 2 to 4 minutes. Converted feed mixers are used in a few plants. They hold about one ton.

Holding bins are used as temporary storage for both raw materials and the blended product. Floor intake hoppers with a screw in the bottom are used for feeding fertilizer materials into elevators.

Bulk-blending plants are divided into three types depending on the

"H-25 PAYLOADER® power-steering and power-shift are the biggest advantages"*

*E. W. Carpenter, Plant Superintendent of G. B. C. Chemical Corp., Fairmount, Indiana also says, *"These features have greatly increased efficiency over any loader previously used. It is fast, and well-balanced for maximum load-carrying capacity."*

Marion Logan, the operator, adds, *"I get more production with less effort because of the easier, faster operation. The even, steady pull delivered by the new power-shift transmission gets full loads with less abuse to the machine."*

There are many reasons why the Model H-25 will dig, carry and deliver more tonnage with lower operating and maintenance costs than anything near its size. One is the power-shift transmission — exclusive in its class — with two speeds forward *and* reverse. Others are the power steer; power-transfer differential; 4,500 lbs. breakout force; 2,500 lb. carry capacity; shortest turning radius of only 6 ft.

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primary direction of material flow through the blending process. These are: (1) Horizontal flow, (2) vertical flow, and (3) combination horizontal-vertical.

In the horizontal flow plant, the blending equipment is on the plant floor and the fertilizer materials move from one blending operation to another by horizontal movements.

In the vertical flow plant, the blending equipment is elevated in a vertical or tower arrangement and fertilizer materials flow from one blending operation to another by gravity. The combined horizontal-vertical flow plant incorporates selected features from the other two.

Vertical flow plants have the highest building and equipment investments. They also have the highest daily output. The relative increase in daily output from adding a second man is greatest in this type of plant because the greater investment permits more flexibility in using labor. The break-even volumes—those necessary to cover all costs—are highest for the vertical plant, mainly because of the higher initial investment cost.

Costs and outputs of the horizontal flow plants follow a pattern just opposite to those of vertical flow plants. Horizontal flow plants have the lowest investments, lowest daily outputs, and lowest breakeven volumes of the three types of plants.

Combination horizontal - vertical flow plants fall between the other two types in costs and outputs.

Potash Operation Gets Under Way in Jordan

AMMAN, JORDAN—Experimental production of potash was begun in Jordan recently, the Government of Jordan has announced.

The plant, having a capacity to produce 5,000 metric tons of potash, annually, is owned by the Arab Potash Co. and financed by the Governments of the United Arab Republic, Iraq, Lebanon, Saudi Arabia, and Jordan. A German firm built the pilot plant and will operate it for a year, after which the Potash Company will invite international bids for the construction of a full-scale commercial plant to produce potash at a volume of 70,000 tons a year.

The production process is the recovery of potash from brines of the Dead Sea.

Woodrow W. Lair

NEW SUPERINTENDENT — Woodrow W. Lair, former assistant superintendent of the U.S. Borax & Chemical Corp. potash refinery in Carlsbad, N.M., has been named refinery superintendent, it is announced by Earl H. Miller, resident manager. Mr. Lair joined the company in 1946 as a chemist, was promoted successively to research chemist, production foreman and to assistant refinery superintendent in 1958. He holds a bachelor of science degree in chemistry from New Mexico A&M.

Young Machinery Co. Buys Pennsylvania Firm

MUNCY, PA. — Young Machinery Co., Inc., has announced its acquisition of the entire plant and manufacturing facilities of the Robinson Manufacturing Co. whose plant is located in Muncy, Penna.

The Young Machinery Co., Inc., whose present plant is located in Pennsdale, near Muncy, Penna., was founded in 1947 and has been engaged in manufacturing materials handling, pneumatic conveying and mixing systems for use in the chemical and many other industries.

The Robinson Manufacturing Co. was founded in 1900 and has been manufacturing a similar but additional line of equipment.

The combined facilities and experience of the two firms will enable the Young Machinery Company, Inc., to increase its production volume and offer a greater diversification of systems and equipment, according to Henry T. Young, president of Young.

The Young Machinery Sales Co., Inc., of which William J. Geist is president, will continue to act as exclusive sales agent for the combined facilities.

Named General Manager of Fertilizer Chemical Firm

PHOENIX, ARIZ. — Seymour Thomas has been named general manager of Cortez Chemical Co., recently organized subsidiary of Arizona Fertilizer & Chemical Co., according to Frank M. Feffer, Sr., president of both firms.

The appointment of Mr. Thomas, former Texas and California chemical company executive, is the first step in a large-scale expansion program at Cortez, Mr. Feffer said. The firm's territory will eventually include all of Arizona and nearby states.

Named Manufacturing Head For California Firm

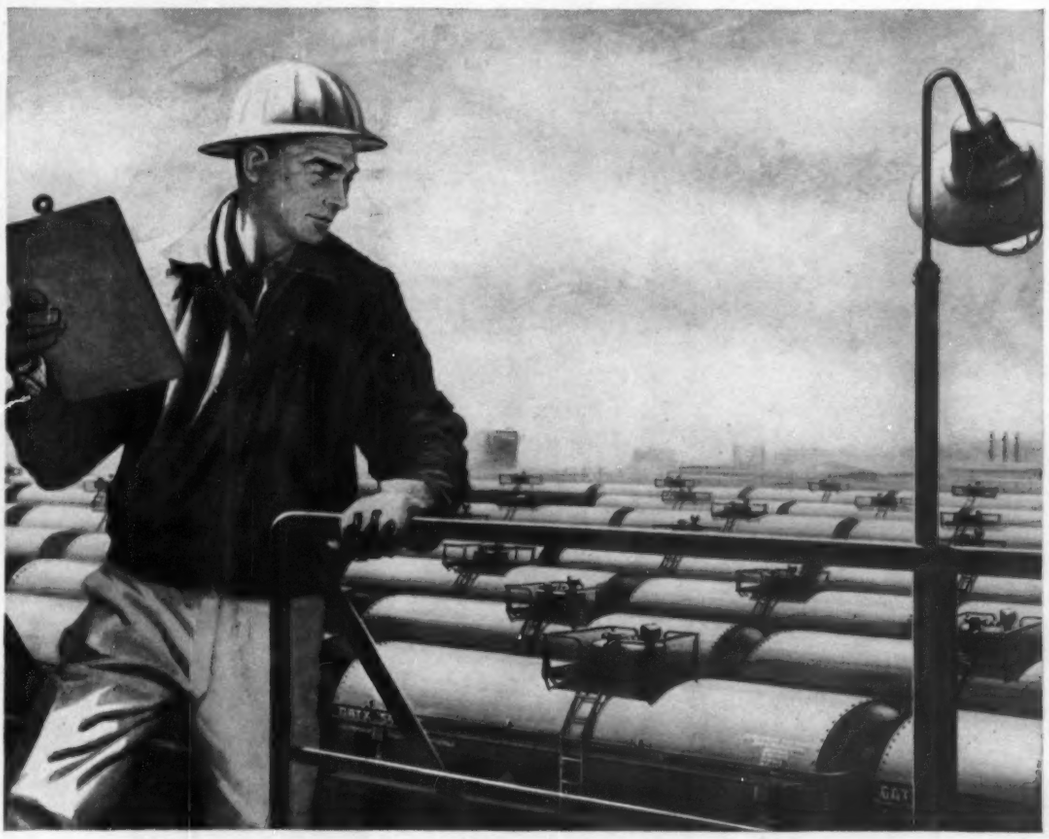
LOS ANGELES—Calvin L. Dickinson has been named director of manufacturing for American Potash & Chemical Corp. plants at Trona, Calif., and Henderson, Nev., it was announced by Parker S. Dunn, vice president, manufacturing.

The change expands Mr. Dickinson's duties to include responsibility for the Henderson plant as well as for the Trona plant where he has headed operations since 1955.

Henry S. Curtis continues as Henderson plant manager reporting to Mr. Dickinson, who will continue to make his headquarters at Trona.

PUBLICITY POST

STAMFORD, CONN. — Howard Mehr has joined the Dorr-Oliver staff to serve as supervisor of technical publicity.



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How Much Deviation? . . .

Problems in Setting Laboratory Analysis

THERE HAS BEEN some difference of opinion concerning the meaning of the terms "true value" and "tolerance" in studies of the errors involved in fertilizer analysis. It would be well at this point to define what these terms mean.

The idea of expressing the "true value" frightens many chemists since it can never be obtained by measurement. For practical purposes we do not need to know the true value. We need merely reduce errors to the point where a narrow range has been established within which the true value almost certainly lies. If this range is small in proportion to the difference between the measured value and the proposed true value, it is satisfactory to use the estimated true value in calculating the error of the measurement. The estimate of the true value is often called the "most probable value."

It is important to note that the true value is not necessarily the average of many analyses carried out by one or more chemists using one of more methods in one or more laboratories. Even if we allow for laboratory biases in the Magruder check series, for example, we know that many variations of several methods are used for N, P and K. There is no compelling reason why the net methodic bias should always be zero.

The word "tolerance" is applied to fertilizer analyses in two distinct ways. First, it indicates the reliability of the analytical figures and in this sense it might be called the "analytical tolerance." The second application of the word "tolerance" might better be expressed by the term "formulation tolerance." It is the variation from guarantee which the manufacturer is permitted after allowance has been made for the analytical tolerance.

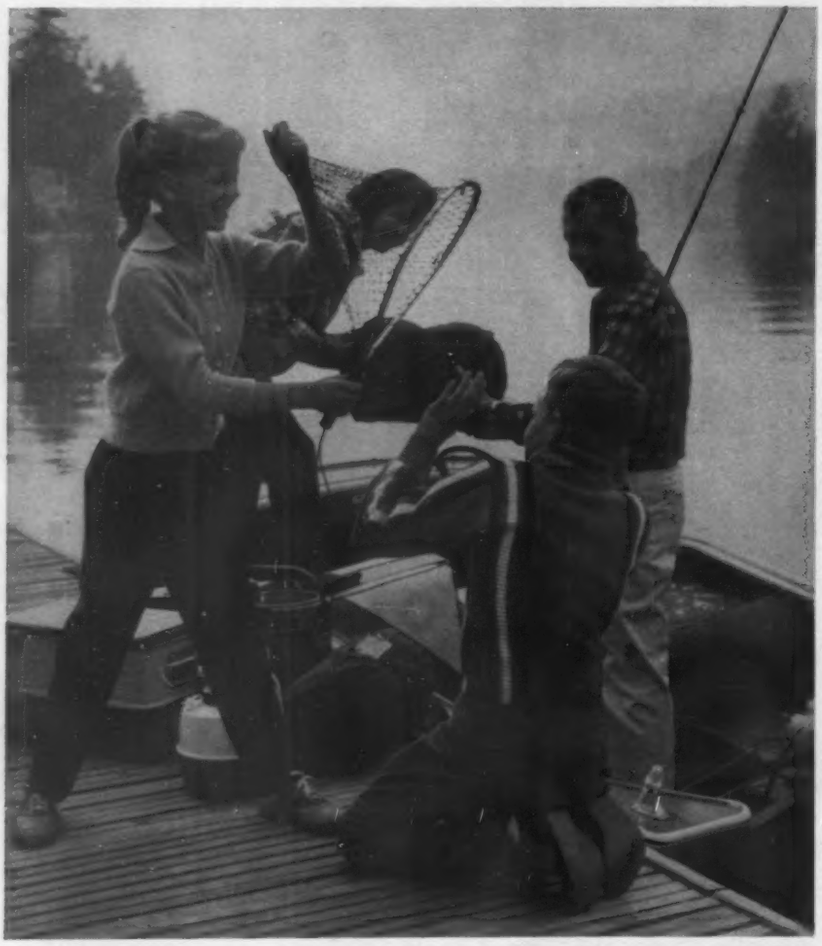
The above distinction in the use of the word "tolerance" was recognized by Miles and Quackenbush in papers on the precision of chemical analyses of fertilizers and feeds which appeared in 1950 and 1955 in the Journal of the Association of Official Agricultural Chemists. Unfortunately the information available to Miles and Quackenbush did not permit them to evaluate variations between sampling instruments, sampling personnel and official laboratories.

From AOAC collaborative studies and reports of the Magruder check series we know that interlaboratory variation is very large. The same studies indicate significant methodic biases and interactions between methods chosen and samples analyzed. We hope that work now in progress will permit reasonably accurate estimates to be made of the additional errors inherent in the sampling and analysis operations. However, further studies are badly needed to measure the probability of error resulting from moisture changes during sampling, sample reduction and sample grinding.

The statistical analysis of the data secured by the National Plant Food Institute's chemical control research project indicates that the interlaboratory bias was the most serious source of error which was not allowed for by the Miles and Quackenbush studies. When sufficient information has been gathered from analysis of the Magruder check series data to determine the magnitude of the interlaboratory bias, it is recommended that the analytical tolerances be broadened.

It should be understood that the fertilizer manufacturers do not have to overformulate to compensate for official errors in sampling and analysis if the tolerances are adequate. The purpose of analytical tolerances is to almost eliminate the risk of having official rejection of product which actually is flat on guarantee. It is obvious, therefore, that if industry should formulate below guarantee, in an attempt to take advantage of the analytical tolerances, it runs a serious risk of being found deficient in analysis.

The need for large analytical tolerances is unfortunate and pre-



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Philip E. Stone J. M. Daniel, Jr.

VIRGINIA - CAROLINA Chemical Corp. has announced two promotions in the manufacturing department of its fertilizer division. Philip E. Stone, formerly technical assistant, has been named assistant to manager, and John M. Daniel, Jr., formerly section leader in research and development, becomes technical assistant to the manager. Both are new positions. Curtis A. Cox, general manager of the manufacturing department, said Mr. Stone will undertake special assignments in addition to retaining responsibilities in V-C's granular fertilizer operations. Mr. Daniel, who has directed V-C's fertilizer pilot plant in Richmond, will be responsible for technical service for customers along with his product control duties.

Tolerances for the of Fertilizer Mixes*

sents a challenge to the chemist. A continuous effort is required to eliminate sources of error in methods and techniques to improve both precision and accuracy.

It has been suggested that tighter tolerances might be applied to the average analysis of a number of samples taken from a chosen grade of fertilizer produced by a specific company. This would tend to reduce the effect of random errors but laboratory bias would remain. It is axiomatic that we cannot place increased confidence in arithmetical mean values unless we are sure that the variations occur on both sides of the true value.

Let us now turn to the second application of the word "tolerance." Suppose that we allow for the analytical tolerance and still find that the sample is below guarantee. Should a "formulation tolerance" be allowed in recognition of the inherent variations occurring in fertilizer production?

The following principle seems logical but currently may be impractical to control. The consumer should be permitted to benefit from the economies resulting from generous "formulation tolerances" provided that:

(a) The variations are without detectable agronomic significance;

(b) No manufacturer is allowed to benefit from a systematic policy of net deficiency from his guarantee.

Should additional tolerance be allowed to cover variations in production of fertilizers over which the industry has little or no control when operating at competitive cost? Examples of this type of variation are:

(a) Segregation of particles taking place in raw materials as well as finished product.

(b) Variations in analysis throughout large shipments of raw materials such as phosphate rock, superphosphate and potash carriers which derive from efficient mining and manufacturing operations.

(c) Occasional losses of nitrogen and available phosphorus exceeding that which is normally allowed for by formulation averages.

Some of these variations are random in nature and the current practice of some states to permit deficiencies in certain constituents to be balanced by overages in others (on an equivalent value basis) seems fair and reasonable. Of course the permitted imbalance should be limited. It is important to distinguish between companies that succeed in balancing deficiencies by an equal value in overages and those with a net deficiency record.

The AOAC book of official methods of analysis has been a great blessing to the analytical portion of government control. Without it the interlaboratory variations would be larger than the current ones. Might not similar benefits result from adoption of uniform, good techniques of statistical treatment of analytical data? This would involve the use of well-known methods of statistical quality control based upon appropriate sampling patterns. The sampling would more accurately represent the actual variability and net deviation from guarantee of each company's production.

It is suggested that we ask the statisticians if they can help us solve the problem of collecting and interpreting data so as to obtain more information at lower cost. In this connection it is interesting to note the joint effort in South Africa between the inspection service and African explosives and chemical industries to work out a statistical sampling plan. A compromise between producer's and consumer's risk is being negotiated.

To summarize I should like to list several conclusions:

1. It has been shown that there are additional uncertainties in judging the reliability of the chemical analyses of fertilizers. These include laboratory and methodic biases and variations in the moisture content of samples.

2. Recognition of these uncertainties by enlarging tolerances might be undesirable because of possible abuses and misunderstandings concerning their purpose.

3. A strong effort should be made to increase the reliability of sampling and analysis of fertilizer so that the analytical tolerances may be reduced.

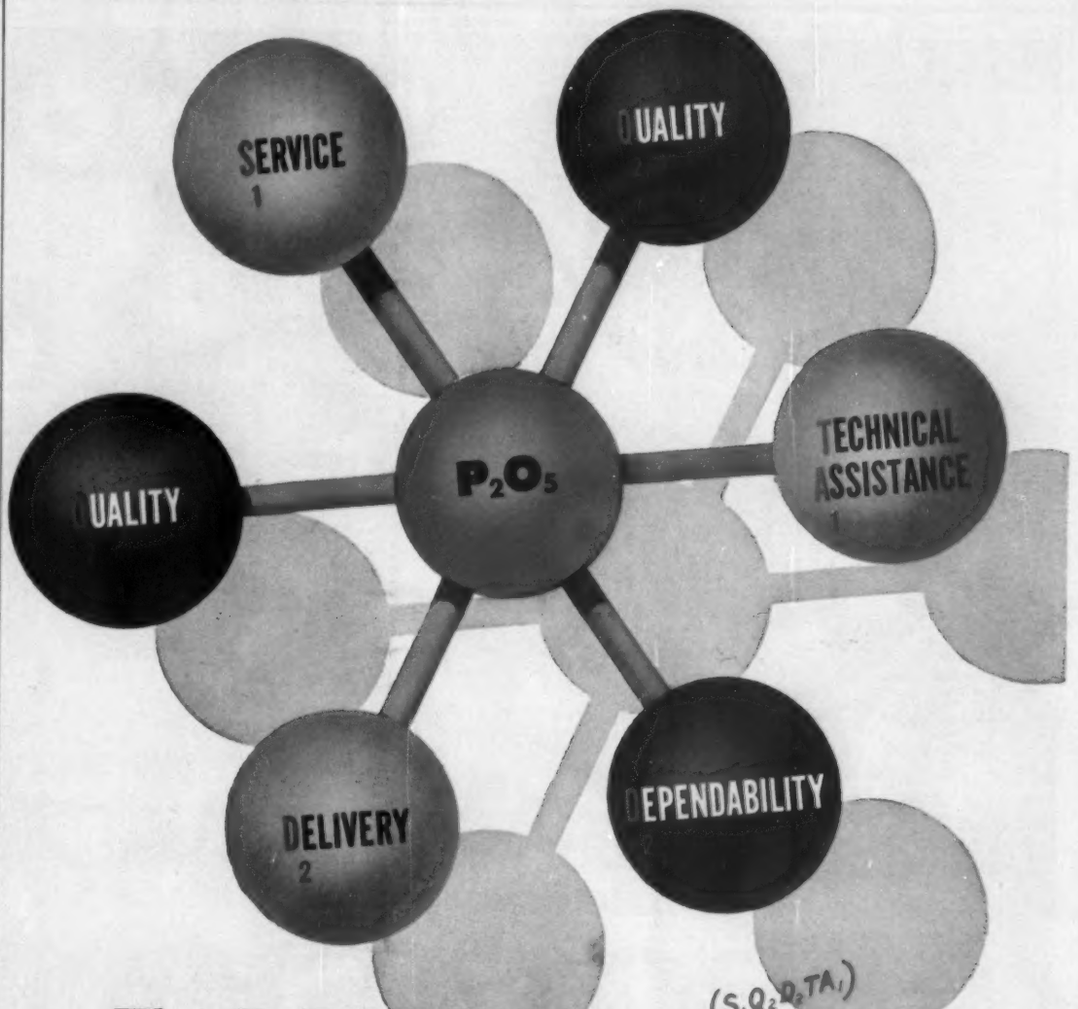
4. It is important to explore the possibility of applying the methods of statistical quality control to the development of a system which adequately protects both the consumer and the reputable manufacturer.

*Paper presented by C. H. Perrin, Canada Packers, Ltd., before 1959 conference on chemical control problems, Washington, D.C.

Inspection Rates Lowered By Oregon Department

SALEM, ORE.—The Oregon State Department of Agriculture recently announced that inspections for commercial fertilizers, agricultural minerals and lime will be sliced from ten cents to five cents for each ton sold.

The substantial increase in the use of such fertilizers has permitted the division of foods and dairies to initiate a balance between the needs and the income of these funds, according to Chief O. K. Beals.



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House Committee Listens . . .

Fertilizer Industry Speaks Up Versus Tax-Exempt Competition

WASHINGTON — Testimony by fertilizer industry spokesmen before the House Ways and Means Committee last week struck hard at the tax advantages enjoyed by farmer cooperative groups engaged in manufacturing fertilizers in competition with private tax-paying firms.

That income from such cooperative operations should be taxed by the federal government like income from private enterprise is taxed, was emphasized by the speakers. This principle was brought out by William M. Horne, Jr., Olin Mathieson Chemical Corp., Baltimore, who acted as spokesman for the Manufacturing Chemists' Assn. He asserted that no exclusion nor deduction should be granted to the cooperative for patronage dividends to the extent that such dividends are derived from unrelated business income.

He also declared that no exclusion nor deduction should be granted for any balance of the patronage dividends unless the dividends representing such balance are distributed in cash.

Mr. Horne told the legislators that the U.S. Treasury is losing some $21 million each year in revenues on business done by co-ops in the fertilizer trade alone. This is possible because of the tax exempt features of existing law, he pointed out. Such operations include some 100 large-scale fertilizer plants, plus other plants producing raw materials for fertilizers and mines producing potash and phosphates, Mr. Horne said.

Edwin J. Putzel, Jr., Monsanto Chemical Co., St. Louis, Mo., told the congressmen that under existing law, cooperatives pay a tax on unrelated income, such as rentals, interests, etc., even though such earnings are distributed to patrons. "In our thinking," he said, "the manufacture of fertilizer and of milking machinery and the operation of an oil refinery are as much unrelated to the basic service function of a cooperative as is the rental of income-producing properties."

Mr. Putzel added that the effect of tax exemption on the U.S. treasury is two-fold: 1. It loses revenues by reason of the exemption granted to the cooperative, and 2, the treasury loses revenue through the competition of cooperatives forcing tax-paying business out of some areas and causing the latter to operate at distant points, thus reducing the taxable income of the businesses.

Joe E. Culpepper, Spencer Chemical Co., Kansas City, Mo., termed as "big business" cooperatives that are organized to mine, manufacture, and distribute fertilizers and fertilizer materials. As an example, Mr. Culpepper cited one co-op which in fiscal 1958-59 reached a sales volume of $153,843,756 against Spencer's sales of $57,584,000.

The Spencer executive reported that within the five-year period ended in 1957, sales of fertilizers and lime by cooperatives increased approximately 50%. "These cooperatives are equal in size and often actually a part of such other industrial cooperative organization as those currently engaged in the ownership and operation of oil wells and refineries, cottonseed oil mills, fleets of commercial transportation equipment, large phosphate mines and upgrading facilities, the making of steel buildings and many other types of industrial undertakings," he told the committee. "None of these cooperatives is any longer an agency for marketing farm products or for purchasing farm supplies for their members.

"They have become substantial aggregations of capital used for the purpose of manufacturing goods. They are, in fact, cooperatives of capital investors."

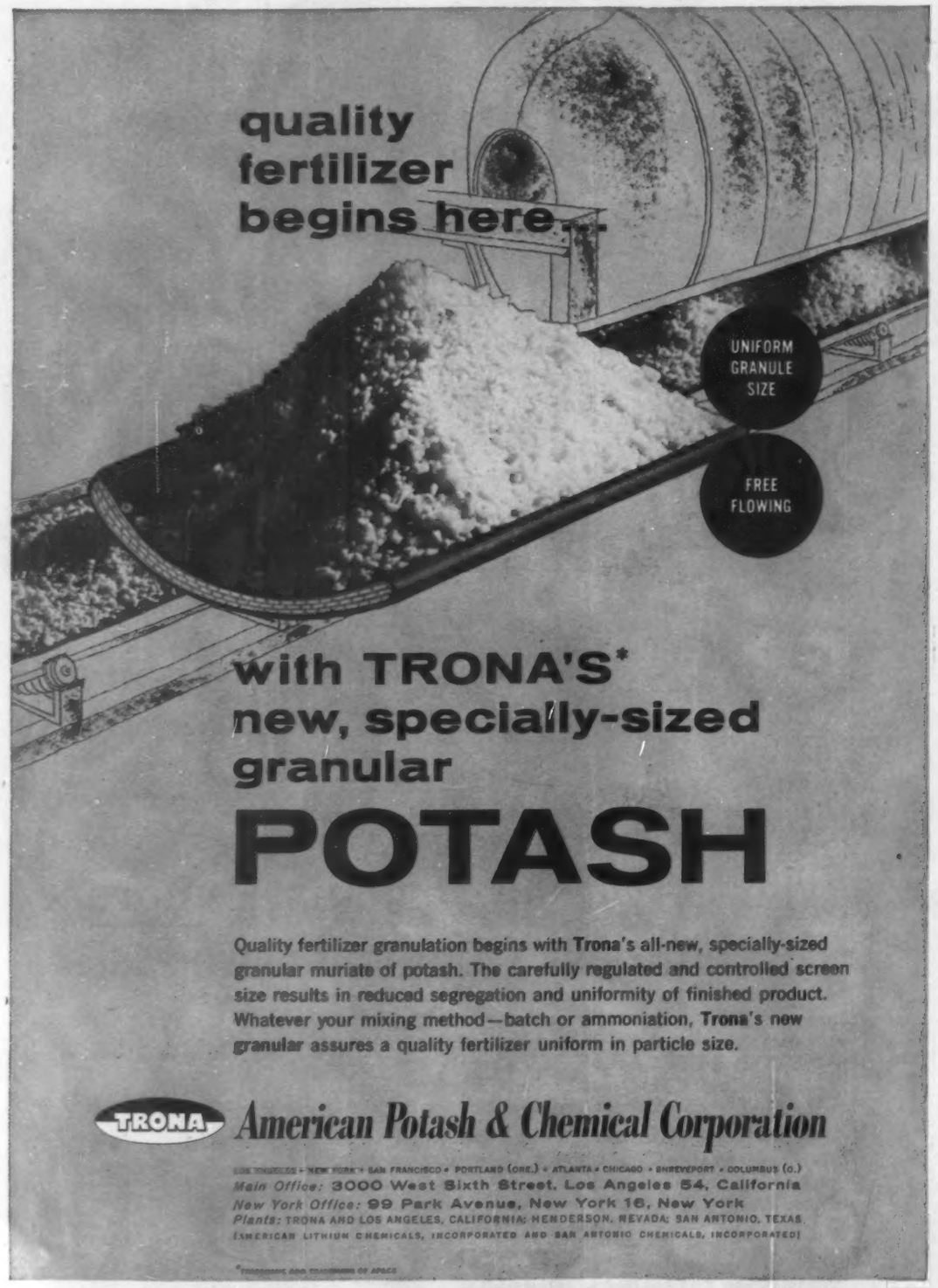
Mr. Culpepper said he had "no quarrel" with 80 to 90% of the cooperatives but "our company is vitally concerned with the remaining small per cent which have converted the cooperative movement into one of cooperative capital investment."

Lawrence A. Coleman, Allied Chemical Corp., New York, hit at the provisions of existing law that permit farm cooperatives to use non-taxed retained earnings for the purpose of making capital investments in facilities for manufacturing and production. He expressed no objection to allowing deduction from income for tax purposes, of patronage dividends when actually paid to the farmer patron.

In addition to representatives of the fertilizer manufacturing industry, a spokesman representing the Grain & Feed Dealers National Assn., also presented facts concerning the way present laws allow a tax loophole which permits approximately $400 million of the net income of cooperative corporations to escape federal income tax.

Roswell Magill, tax authority, told the committee that taxation of this income would not only produce an estimated $150 million to $200 million of needed revenue for the government but would remove a tax inequity which now gives cooperative corporations an important competitive advantage in buying and selling agricultural commodities and supplies.

The estimated gross business of these farm cooperatives, he said, was approximately $13.5 billion in 1957 and has probably increased to $15 billion at the present time. The estimated $400 million net margins earned by cooperatives represent less than 3% of this gross volume of business, a return below that estimated in 1957 by the Farmer Cooperative Service, a U.S. Department of Agriculture agency. The revenue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loss estimate therefore is believed to be very conservative.

In their congressional appearances, cooperative leaders have sought to understate the volume of business cooperatives carry on in the nation's economy, Mr. Magill claimed. Nevertheless, a representative of the cooperatives conceded before the Ways and Means Committee in December, 1959, that the business of cooperatives approximately equalled the $15 billion combined 1958 total sales done by such corporate giants as Standard Oil of New Jersey, A. & P., International Harvester, and National Dairy as a group. These business corporations paid $540 million of federal income taxes to the U.S. in 1958 while cooperative corporations doing about the same volume of business paid only a nominal amount.

"The present legislative maneuver of the cooperatives," Mr. Magill said, "is to endeavor to shift the taxes on the income they earn to their farmer-patrons who receive little if any of such profits in cash. Rather, the patrons are generally given merely paper evidence of the rapidly increasing surpluses of the cooperatives and these statements have no cash value as the courts have held."

"This shift of tax to the farmer-patron is not fair and won't work," said Mr. Magill. "It will not relieve the competitive inequity between cooperative and non-cooperative corporations. More than that, it will produce little in the way of revenue for the government; it has serious legal difficulties and would be extremely hard for the treasury department to administer."

"It does not seem quite right," Mr. Magill declared, "to make a farmer pay a tax out of his own pocket on a dividend he may never receive in cash. The income tax ought to be paid by the cooperative corporation that makes the money, not by the farmer who does not receive it."

"Congress must recognize that cooperative corporations are business enterprises just like their non-cooperative competitors, that they are organized and operate under the same laws and enjoy the same rights and privileges as other corporate citizens of the U.S.," said Mr. Magill. "Government services cost money and for the most part are paid for by the federal income tax. Cooperative corporations, although a large and important part of the business community, pay little if any corporate income tax, and hence contribute little toward the cost of government. This is the main point we want to make," concluded Mr. Magill, "and Congress must act now to close the existing loophole."

The congressional committee is making a study of bills which would subject industrial-type cooperatives to taxes comparable to those levied on firms which are not permitted such tax exemptions.

New Plant for Formosa

TAIWAN, FORMOSA—Construction of Formosa's first privately-owned chemical fertilizer plant is being planned by a group of local private investors. Details are being developed by China Technical Consultants, Inc. First announcements indicate that the new facility, when completed at Kaosiung, will have a yearly capacity of upwards of 50,000 metric tons.

Fatal Injuries

BALTIMORE, MD.—A crane operator who had left his machine was crushed to death recently when another overhead crane caught him against an 18-inch I-beam at the Fertilizer Manufacturing Cooperative, Inc., Baltimore.

The victim of the accident was Cecil Carroll, 32, of Baltimore. He was checking bearing trouble on his crane. Where the side of the moving crane crushed him against the beam there is a normal clearance of three inches.

Monsanto Sets New Safety Records in Plants

ST. LOUIS—The safety record of Monsanto Chemical Co. in 1959 was second only to the all-time record year of 1958, the company has announced. The 1959 accident frequency was .73 major injury per 1,000,000 man-hours worked at the company's 38 locations, compared to the .69 rate in 1958.

The 1958 chemical industry safety record, the latest reported by the National Safety Council, is 3.56 major injuries per 1,000,000 man-hours worked.

Among the group working 1,000,000 man-hours a year, Mound laboratory at Miamisburg, Ohio, won the president's trophy for the best safety record during the year. The laboratory operated the entire year—1,619,031 man-hours—without a major injury. It also won the safety improvement plaque in its group for the greatest improvement in injury frequency rate over the last five years.

The president's trophy for groups working between 200,000 and 1,000,000 man-hours annually was won by the Dayton (Ohio) laboratory which had no major injuries in 1959 during its 739,046 man-hours of operations.

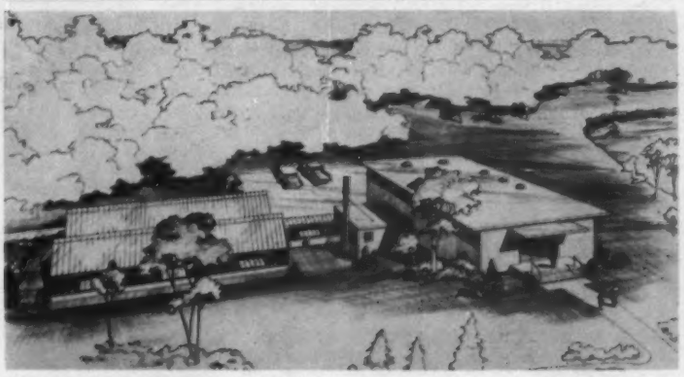
The Santa Clara (Calif.) plant in the group working less than 200,000 man-hours a year won the president's trophy in its group for the second consecutive year by operating injury-free during the year. The plant also won the safety improvement plaque in its group.

The company's executive committee award, made to the location in each group which has the best man-hour record since the last major injury, was won by the El Dorado (Ark.) chemical plant, with 10,904,310 injury-free man-hours in the past 6½ years. This plant holds the company's general manager's award for the best plant safety record.

FIRM INCORPORATES

ALAMOSA, COLO.—San Luis Valley Fertilizer Co., Inc., has filed articles of incorporation with incorporators to include: J. A. McDaniel, Henry Quiller, George M. Oringdulph and Ralph Tharp. Directors will be Messrs. McDaniel, Quiller, Oringdulph, Tharp and R. M. Pitcher.

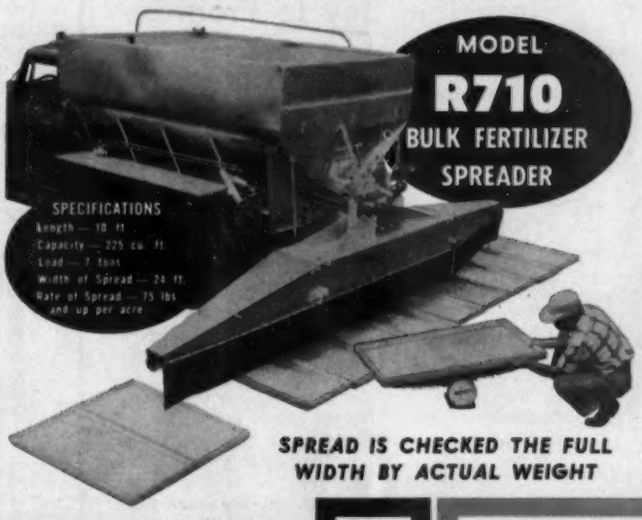
STEDMAN OFFICERS—Howard F. Voigt, seated, has been appointed as the new president of Stedman Foundry & Machine Co., Inc., Aurora, Ind., currently celebrating its 125th anniversary. Also shown with Mr. Voigt are other Stedman executives, standing, left to right: L. A. "Dusty" Rhodes, manager, machinery division; Les Etter, executive vice president, and L. H. Rushworth, manager, foundry division. Mr. Voigt comes to Stedman, a subsidiary of United Engineering and Foundry Co., Pittsburgh, Pa., as a veteran of more than twenty years service with the parent organization—most of it spent in Japan and the Far East. The company manufactures mining, blending, screening, elevating and conveying machinery for the chemical fertilizer industry. The firm was founded in the latter part of 1834 by Nathan R. Stedman.



BIOLOGICAL RESEARCH LABORATORY—Union Carbide Chemicals Co., division of Union Carbide Corp., plans to build a biological research laboratory on its research farm at Clayton, N.C. Both basic and applied research for the agricultural chemical development of the company will be conducted here, according to E. E. Fogle, president. The new building, drawing above, will cover 10,000 square feet with an additional 2,700 sq. ft. covered by adjoining greenhouses. The laboratory is expected to be ready for use in August of this year.

GIVE YOUR FERTILIZER CUSTOMERS WHAT They WANT

. . . A GUARANTEED EVEN, ACCURATE SPREAD — FULL WIDTH, NO SKIPS



SPREAD IS CHECKED THE FULL WIDTH BY ACTUAL WEIGHT

The Simonsen spreader is not an adaptation of a lime spreader. It is designed to spread high analysis fertilizers accurately and evenly, down to 75 lbs. per acre. Superb performance results in positive customer satisfaction, and unequalled maintenance-free operation. Leasing plans available.

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- Hydraulic fan drive.
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- Simple adjustment for spreading rate.
- Rubber shock absorbers on hoods.

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for further information about the R710, plus a full line of other Simonsen bulk fertilizer bodies and the new Simonsen Feedilizer (a dual-purpose bulk feed and bulk fertilizer body).

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PRODUCTION EDITION

Editorial

25,140,000 Tons . . .

Industry's Production Know-How Comes to Front in Record 1959 Fertilizer Tonnage

AN INCREASE of 11.7% in the consumption of fertilizer in the U.S. during the year ended June 30, 1959 is a significant statistic to the manufacturing industry. What does the grand total of 25,143,000 tons indicate to the fertilizer producer? For one thing, it means that some 2,627,000 additional tons of plant food mixtures and materials were made during that period and points straight to the fact that sales efforts made in the trade are paying off.

Of all the states, only seven failed to show an increase in consumption, according to the preliminary report issued recently by the U.S. Department of Agriculture. These seven states represented only 7.3% of the total U.S. consumption.

The area of largest increase was designated by USDA as the West North Central region which increased its use 621,000 tons, or 26.9% over the use figures of last year.

Of interest to fertilizer mixers is the fact that consumption of mixtures increased 10.9% over last year to total 15,921,000 tons. This amounted to 63% of the entire weight of fertilizers sold during the year. This is the first time since 1952-53 that mixtures have shown an increase and the total established a new peak in consumption, the report stated.

Interesting also is a review of the grades of fertilizer mixtures accounting for the most tonnage. These included 4-12-12; 5-10-10; 5-10-15; 5-20-20; 6-12-12; and 12-12-12 which represented nearly 60% of the total increase in consumption of mixed fertilizers. These were the most popular grades among the 46 which were consumed in amounts of 50,000 tons or more. These 46 grades accounted for nearly 80% of the total tonnage of mixed fertilizers, while it took 1,600 other grades to account for the remaining 20% of mixed goods.

It might be a good question about whether the small-selling grades are economical to make, but it should be remembered that in some states, particularly Florida, the demand for literally hundreds of special grades for different crops requires manufacturers to provide mixtures in accordance with the need.

With mixtures on the upgrade, does it mean a lessening of materials for direct application? Not at all, according to the report. Consumption of these direct application materials amounted to 9,222,000 tons last year, comprising 36.7% of all fertilizers used. Included in this tonnage were 7,996,000 tons of products containing one or more of the primary plant nutrients, and 1,214,000 tons of products containing only secondary and trace elements.

The increase of the former was 10.9% and the latter, 29.2%, over the 1957-58 figures. The upward change in these direct application materials corresponded closely with the change in consumption of mixed fertilizers in nearly all of the regions.

Primary plant nutrients also increased significantly. Manufacturers are making higher analysis goods and this reflects in the totals. USDA says that some 7,396,000 tons of primary plant nutrients (N, K_2O, P_2O_5) were consumed during the fiscal year. This represented an increase of 884,000 tons, or a gain of 13.6% over the previous year.

Consumption of nitrogen was 2,643,000 tons, an increase of 359,000 tons (15.7%); of available P_2O_5, 2,576,000 tons (12.3% more) and that of K_2O 2,177,000 tons, an increase of 12.5% over the 1957-58 year.

Beyond mere tonnage gains in mixed fertilizer tonnages is the significant information that primary nutrients contained in these products were also on the increase. Manufacturers are making higher analysis goods and this fact reflects unmistakably in the figures. Mixed fertilizers were responsible for 36.8% of the increase in nitrogen consumption; 82.3% of the P_2O_5 and 90.1% of the K_2O.

The weighted average of primary nutrients contained in mixed fertilizers continued in an upward trend, with nitrogen increasing 6.20%; P_2O_5, 12.76%; and K_2O, 11.94%. All of the percentages were greater than those registered last year.

At this point, no one knows how next year's report will compare with the one just in for the 1958-59 fertilizer consumption record, but one thing is sure . . . the manufacturing industry is equipped to handle any foreseeable need for increased production. Our hope is that this need will show itself during 1960.

There are many indications that it will.

Research, Key to Progress

MUCH OF THE TECHNOLOGICAL development realized in the agricultural chemical industry during the past 15 years or so, naturally has sprung from research and allowing inquiring minds to work freely. The introduction of scores of new pesticides during the past nearly two decades and the advancements in fertilizer-manufacturing techniques within late years offer perfect illustrations of results of continual study.

Best results are obtained of course through team activities, since such group effort has proved to be of greatest worth. Until relatively recent times, invention had been almost an individual effort and was primarily confined to mechanics. With the stepped-up pace of development, individual invention tended to be too slow.

It is encouraging for the agricultural chemical industry to realize that its efforts are paying off in improving and streamlining production and finding new ways of making better products.

There are some who say "we have gone far enough . . . we don't need to improve much from this point." That's what they were saying a hundred years ago, and we know it isn't true. With every breakthrough of science, a whole area of new challenges is seen ahead.

Let's not sell research short. It's an indispensable ingredient for future progress.

Croplife's Home Office

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PRODUCTION EDITION

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price 25¢.

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Donald Neth, Managing Editor

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Industry Meetings

Feb. 16—Montana State College Soils and Fertilizer Short Course, Ag Auditorium, Bozeman, Mont.

Feb. 17, 18, 23-25—Indiana Ammonia Service Schools; Feb. 17, Lafayette; Feb. 18, Bedford; Feb. 23, Valparaiso; Feb. 24, Ft. Wayne; Feb. 25, Muncie.

Feb. 18—Montana State College Soils and Fertilizer Short Course, Auditorium-Federal Building, Missoula, Mont.

Feb. 22-25—Weed Society of America meeting, in conjunction with Western Weed Conference, Cosmopolitan Hotel, Denver, Colo.

March 1-2—Western Cotton Producers' Conference, Bakersfield Hacienda, Bakersfield, Cal.

March 1-3—President's Conference on Occupational Safety, Department of Labor Auditorium, Washington, D.C.

March 2-6—Southern Safety Conference, annual meeting, Hotel Robert Meyer, Hotel George Washington, Jacksonville, Fla.

March 22-23—Western Agricultural Chemicals Assn., spring meeting, Miramar Hotel, Santa Barbara, Cal.

April 11-13—Annual California Fertilizer Conference, Fresno State College, Fresno, Cal.

June 13-18—National Plant Food Institute annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 21-22—Annual meeting, Southern Feed & Fertilizer Control Officials, Riverside Hotel, Gatlinburg, Tenn.

July 13-15—Eleventh annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City. B. R. Bertramson, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

July 27-30—Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Texas.

Sept. 29-30 — Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 17-21—National Safety Congress, 48th annual meeting. Fertilizer Section meets at La Salle Hotel, Chicago.

Nov. 13-15—California Fertilizer Assn., 37th annual meeting, del Coronado Hotel, Coronado, Cal.

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Personnel Changes Made By Central Farmers

CHICAGO—Avery Stutts has resigned as general manager of the Idaho Phosphate Works, according to an announcement made by Joseph J. Lanter, president of Central Farmers Fertilizer Co.

Mr. Lanter further announced that Paul Cairns, administrative vice president, will act as the general manager of the Idaho Phosphate operations for the immediate future. Other key personnel will include James Colvin who will be in charge of engineering and process control and Herb Roubidoux as plant superintendent in charge of production. These changes became effective Jan. 15, 1960.

On Dec. 1, L. E. Quiram became general purchasing agent of Central Farmers. In this capacity he will direct the services and purchasing of all goods that the company buys for its own use. He retains the responsibility for member company and public relations.

On Dec. 1, Nate Weber was named plant purchasing agent of the Idaho Phosphate Works.

Canadian Plant Plans Open House Observance

TILBURY, ONT., CANADA — Rainbow Chemicals, Ltd., has announced an open house observance to be held Feb. 23 between 1 and 5 p.m.

Purpose of the open house, according to R. T. Henry, manager, is to mark completion of the company's current expansion program and to exhibit its equipment for manufacturing liquid fertilizers. The program will include a slide showing and a tour of the plant followed by light refreshments.

"This will be a friendly get together; a chance to see the Rainbow liquid fertilizer plant and to inspect the new machines," said Mr. Henry.

FERTILIZER FIRM FILES

DOVER, DEL.—International Fertilizer Co. filed a charter of incorporation with the corporation department of the Secretary of State's office here. The Prentice-Hall Corporation System, Inc., Dover, Del., is serving as the principal office.

CALENDAR FOR 1959-60

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300 Expected At California Conference

SACRAMENTO, CAL. — The Eighth Annual California Fertilizer Conference will be held April 11-12 at Fresno, according to its sponsor, the Soil Improvement Committee of the California Fertilizer Assn. Three hundred persons are expected to attend including farmers, fertilizer management, salesmen and technicians, official workers of the university and state colleges, and the federal and state departments of agriculture, laboratory technicians, and processors' field representatives.

The program is being developed around a theme of "Phosphate Fertilization," by a sub-committee under the direction of J. H. Nelson, Nelson Laboratories, and Earl R. Mog, Growers Fertilizer Co., both of Stockton.

Formal program is scheduled for the mornings of both days, in the auditorium of McLane Hall, Fresno State College. On the afternoon of the 11th, a field tour of fertilizer plots and demonstrations in the vicinity of the campus will be held.

While the specific speakers have not yet been secured, it is planned to have University of California and other institutional technicians, as well as those from the fertilizer industry present the latest information concerning fertilizer practices, with emphasis on phosphate fertilization. On the morning of the 11th, an outline of the geology and manufacture of phosphate fertilizer materials will be given. Robert Z. Rollins, chief, California Bureau of Chemistry, Sacramento, will discuss industry problems as seen by his office. Reports of new phosphate fertilization information will be presented concerning several of California's principal crops.

On the morning of April 12, a panel discussion will be conducted on the subject "Legume Fertilization," with a panel of experts leading up to general audience discussion.

The annual banquet will be held at the Fresno Hacienda Hotel on the evening of April 11. Earl Coke, vice president, Bank of America, San Francisco, has been invited to be the featured speaker on the subject "A Banker Looks at Fertilization For Enhanced Loan Security."

All persons interested in soil fertility and plant nutrition are invited to attend. No registration fee will be charged, according to the committee, which pointed out that this conference will provide an opportunity for farmers and others to obtain the latest fertilization information, and to get answers to their questions on the subject. For information and a copy of the program when available, communicate with the California Fertilizer Assn., 719 K Street, Sacramento 14, Cal.

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge $2.25. Situations wanted, 10¢ a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $11 per column inch.

All Want Ads cash with order.

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MECHANICAL FOREMAN—LARGE PLANT that acidulates, granulates and open mouth packing equipment to supervise maintenance. Address Ad No. 6598, Croplife, Minneapolis 40, Minn.

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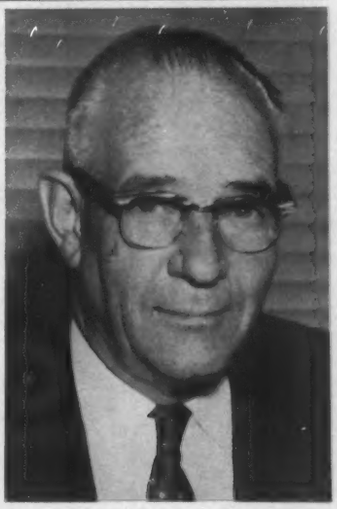
Howard J. Grady



Arthur W. Mohr

TO HEAD CALSPRAY—Howard J. Grady, left, was named president of California Spray-Chemical Corp., Richmond, Cal. to succeed Arthur W. Mohr, whose retirement became effective Feb. 1. Mr. Grady was advanced to president from the position of executive vice president. He joined the firm in 1926 as a research entomologist and held numerous responsible posts in the intervening years. Mr. Mohr had been president for the past 13 years. He is a former president of the National Agricultural Chemicals Assn. and served on its board.

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